Research Report

Sustainable WASH Systems Learning Partnership

SANITATION IN SMALL TOWNS — DEBRE BIRHAN, ETHIOPIA ENDLINE ASSESSMENT

November 2021

PHOTO CREDIT: LUCIA HENRY

USAID
FROM THE AMERICAN PEOPLE

SUSTAINABLE WASH SYSTEMS

Prepared by: Tetra Tech

Acknowledgments: We could not have completed the sanitation endline data collection without the efforts and enthusiasm of the larger Debre Birhan Learning Alliance members. Special thanks go to the town municipality, heath offices, and Water Supply and Sewerage Enterprise. These key WASH stakeholders supported the endline survey endeavor by assisting with data collection, providing information, and facilitating the process.

Front cover: Community members participate in a communal latrine management training in Debre Birhan. Credit: Lucia Henry

About the Sustainable WASH Systems Learning Partnership: The Sustainable WASH Systems Learning Partnership is a global United States Agency for International Development (USAID) cooperative agreement with the University of Colorado Boulder (UCB) to identify locally driven solutions to the challenge of developing robust local systems capable of sustaining water, sanitation, and hygiene (WASH) service delivery. The consortium of partners — Environmental Incentives, IRC, LINC, Oxford University, Tetra Tech, WaterSHED, Whave, and UCB — are demonstrating, learning about, and sharing evidence on systems-based approaches for improving the sustainability of WASH services in four countries.

This report is made possible by the generous support of the American people through USAID under the terms of the Cooperative Agreement AID-OAA-A-16-00075. The contents are the responsibility of the Sustainable WASH Systems Learning Partnership and do not necessarily reflect the views of USAID or the United States Government. For more information, visit www.globalwaters.org/SWS, or contact Karl Linden (karl.linden@colorado.edu) or Ryan Mahoney (rymahoney@usaid.gov).

USAID FROM THE AMERICAN PEOPLE

SUSTAINABLE WASH SYSTEMS A LEARNING PARTNERSHIP

TETRA TECH

Table of Contents

List of Figures

List of Tables

Acronyms

CSDA	Citywide Service Delivery Assessment
DBWSSE	Debre Birhan Water Supply and Sewerage Enterprise
ETB	Ethiopian Birr
FSD	Fecal Sludge Disposal
FSM	Fecal Sludge Management
HH	Household
HHS	Household Survey
KII	Key Informant Interview
LCD	Living Conditions Diamond
MSS	Municipal Services Sanitation
NGO	Nongovernmental Organization
OWNP	One WASH National Program
SCA	Sanitation Cityscape Approach
SDU	Service Delivery Unit
SEUHP	Strengthening Ethiopia Urban Health Project
SFD	Fecal Waste Flow Diagram (also known as Shit Flow Diagram)
SME	Small and medium enterprise
SPP	Service Provider – Public
SPU	Service Provider – Private
SWS	Sustainable WASH Systems Learning Partnership
UHEW	Urban Health Extension Workers
ULG	Urban Local Government
USAID	United States Agency for International Development

USD	U.S. dollars
UWSSP	Urban Water Supply and Sanitation Project
WASH	Water, Sanitation and Hygiene

Executive Summary

The overall objective of this report is to provide an endline assessment of the sanitation system in Debre Birhan, Ethiopia, in 2021 as part of the United States Agency for International Development (USAID) Sustainable WASH Systems Learning Partnership (SWS) (2016–2022). SWS is led by the University of Colorado Boulder with consortium partners Environmental Incentives, IRC, LINC, Tetra Tech, WaterSHED, Whave, and the University of Oxford. In Ethiopia, SWS focuses on improving decentralized water, sanitation, and hygiene (WASH) service delivery by understanding and influencing local WASH systems. This report focuses on the small-town sanitation component of SWS activities in Ethiopia, led by Tetra Tech.

The methodology and data collection instruments for this assessment were developed from the Sanitation Cityscape Approach, also used for the baseline assessment, to assess sanitation at a city-wide level, from households to governance and institutional structures.

Key findings from the assessment are as follows:

- **Sanitation stakeholders have a shared vision**. Learning alliance members found the SWS process and learning alliance platform helped the town's sanitation stakeholders achieve a shared vision or common agenda for sanitation, work at the scale of the town (rather than projects), improve collaboration, and support joint planning and decision-making. Its membership remained consistent and committed, despite some turnover of representatives in local government.

- **Primary emptying service provision moved from the Debre Birhan Water Supply and Sewerage Enterprise (DBWSSE) to private companies.** This shift was primarily due to the closure of the fecal waste disposal site and DBWSSE pausing the provision of emptying services for most of the year leading up to the endline. DBWSSE resumed emptying service provision in March 2021.

- **The amount households were paying for emptying services increased.** The endline found an increase in DBWSSE emptying fees from $14.60 at baseline to $20, representing a 36 percent increase. Private sector rates increased from $22–$25 to a price range of $36–$99, representing an increase of at least 63 percent and up to 296 percent. DBWSSE emptying rates are fixed, so in their absence from the market, households and public latrine operators paid more for emptying services than at baseline. In some cases private firms incur higher costs from traveling long distances (thus incurring greater expenses); it seems apparent that these costs, as well as inflated rates, are being transferred to households.

- **The sanitation service chain has broken down.** At baseline, the largest risk of unsafely managed sanitation was identified as fecal sludge being disposed of at a dedicated site but not treated. There were also some localized issues of nuisance and seepage to local farmland. However, with the closure of the disposal site for most of the last year, all of the waste that once reached the disposal site is now being discharged to the environment at different locations. As such, at endline, the most significant risk of unsafely managed sanitation is fecal waste not

reaching a dedicated site and being discharged to ditches, rivers, and farmland in and around the town.

- **There is stronger environmental protection enforcement and awareness.** At baseline, enforcement of environmental protection laws was low. At endline, while there are still some challenges around resources and capacity for enforcement, the study noted a shift toward a stronger mandate to exercise environmental protection regulations within a wider context of improved environmental awareness.

- **There is a stronger enabling environment.** A stronger enabling environment was observed at endline in the areas of operationalizing national policy, strategy, and regulatory frameworks at the town level. In addition, the endline assessment found greater clarity around institutional arrangements, roles and responsibilities, and coordination among stakeholders.

At the same time, many of the challenges identified at baseline remain, and both the service delivery environment and the living environment are marginally "weaker" than they were at baseline. This means that positive changes happening at the town level have yet to benefit town residents. The challenges around commercial and industrial wastewater management remain significant, unaddressed, and under-resourced in terms of capacity and prioritization in the town, and risk impacting fecal sludge management (FSM) developments.

Recommendations based on the endline assessment fall largely under two threads: (1) a focus on maintaining and strengthening accountability and ownership for sanitation in the town; and (2) a focus on finding collective countermeasures to tackle the root cause of several issues, notably the illegal disposal of fecal waste from homes, businesses, and industry.

Recommendations to maintain and strengthen accountability and ownership:

- **Strengthen town decision-making around sanitation and hygiene.** Coordination and the speed of decision-making remain challenges, and mechanisms for joint planning across urban development streams (particularly waste management) should be strengthened. Maintaining the learning alliance, or another town-level decision-making forum on town sanitation, would be beneficial, as well as extending the membership to include environmental protection actors, those closest to the problem at kebele level, and the largest polluters.

- **Design for extended external support for the learning alliance.** SWS provided accountability and momentum for the learning alliance through regular communication and follow up visits to Debre Birhan. However, a 5-year timeframe is short in terms of changing mindsets and bringing about changes, and there is a risk that this momentum will end without SWS support. This could be mitigated in part through learning alliance members taking on this accountability.

- **DBWSSE should maintain a role as the FSM service provider, regardless of whether the fecal sludge disposal site is operational.** At a minimum, DBWSSE should ensure emptying fees remain fixed and affordable for households and businesses in the absence of service provision, maintain a forum for residents to receive information and ask questions, and

mitigate environmental and public health risks of indiscriminate dumping. DBWSSE may potentially continue to provide emptying services if there are options to use disposal sites further afield.

- **Provide accountability and improvements for public latrine management.** The town administration, DBWSSE, and the learning alliance should engage with the Water Development Commission and Second Ethiopian Urban Water Supply and Sanitation Project draft *National Public Toilets Management Guidelines* (2021) to consider alternative management models for public toilets to improve public toilet service delivery.

Recommendations for collective countermeasures to tackle the root cause of several issues:

- **Enforce compliance of environmental regulations by commercial actors.** The town and regional departments of trade, industry, and environmental protection — potentially leveraged through the municipality, learning alliance, DBWSSE, or other players — should mandate that breweries actively pursue financing and modernization to construct an on-site treatment plant. Commercial actors who breach environmental regulations should be penalized with the funds channeled back to waste management of the town; the learning alliance could mobilize public support in favor of this. .

- **Expand existing public health campaigns to include fecal waste management.** Promote better fecal waste management as part of a wider "Cleaner Debre Birhan" or "Healthy Homes" agenda to better engage households and raise the profile of FSM.

- **Identify shared and tangible solutions:** It is imperative to find shared solutions across the various waste management streams, including establishing fixed pricing structures (of solid and liquid waste), generating revenue streams for waste management, and securing land for a new temporary waste management site until the permanent fecal sludge treatment site is finalized.

Introduction

Background and Context

The Sustainable WASH Systems Learning Partnership (SWS) is a 5-year project (2016–2022) led by the University of Colorado at Boulder with consortium partners Environmental Incentives, IRC, LINC, Tetra Tech, WaterSHED, Whave, and the University of Oxford. The consortium aims to develop, test, and document high-potential approaches to engaging local WASH service delivery systems across multiple countries and contexts to advance sector knowledge in the development, application, and scaling up of a WASH local systems framework while also providing concrete improvements to service delivery within the countries, districts, and cities involved in the project.

To achieve this goal, SWS activities in Ethiopia focus on improving decentralized WASH service delivery by understanding and influencing local WASH systems. Tetra Tech, along with partners IRC and LINC, aims to improve the quality and sustainability of WASH service delivery by operationalizing USAID's Local Systems Framework principles. The SWS team works with USAID and local actors in Ethiopia to develop and test a structured and replicable approach to iteratively engage with, understand, and strengthen decentralized local systems responsible for WASH service delivery.

Collectively, the SWS team in Ethiopia aims to establish a proof-of-concept toolkit for how to map, analyze, understand, work effectively within, and eventually strengthen complex local WASH service delivery systems in rural areas and small towns. The technical approach involves working closely with local actors through multi-stakeholder groups called learning alliances to develop and execute a shared learning and action agenda based on a comprehensive understanding of the local systems influencing the delivery of water and sanitation services in discrete jurisdictions (towns or districts).

Tetra Tech leads the small-town sanitation component of SWS's activities in Ethiopia. The goal of this component is to improve the quality and sustainability of sanitation services in two small towns, Debre Birhan and Woliso, with a focus on fecal sludge management (FSM) services and improvement of the management of shared latrines. Ultimately, SWS aims to strengthen the local systems responsible for these services to operate more effectively and efficiently.

Debre Birhan is the zonal capital of the North Shewa Zone in the region of Amhara. In 2020, the Debre Birhan Town Administration reported the town had a population of 137,966 people.[1] The town is located 120 km northeast of Addis Ababa. It has a well-performing public utility, Debre Birhan Water Supply and Sewerage Enterprise (DBWSSE), which provides emptying services and manages a fecal sludge (FS) disposal site. SWS conducted a scoping visit in August 2017 and determined Debre Birhan to be a suitable setting for project activities because of its advanced levels of sanitation services, relative to other similarly sized Ethiopian towns. Additionally, Debre Birhan is targeted in the World Bank's Second Urban Water Supply and Sanitation Project (UWSSP) that began in 2017. UWSSP allocates 70 percent of an estimated $241 million project budget to sanitation in 22 secondary cities.

[1] Debre Birhan Town Administration and Socioeconomic profile, September 2013.

Objectives

The overall objective of this report is to provide an endline assessment of the sanitation systems in Debre Birhan in 2021 as part of the SWS project. It adopts a similar format to the baseline study, conducted in 2018.[2] The baseline assessment of sanitation service delivery focused on factors and actors across the sanitation value chain is critical to the initial "understanding by stakeholders" phase of the SWS theory of change (see Figure 1).

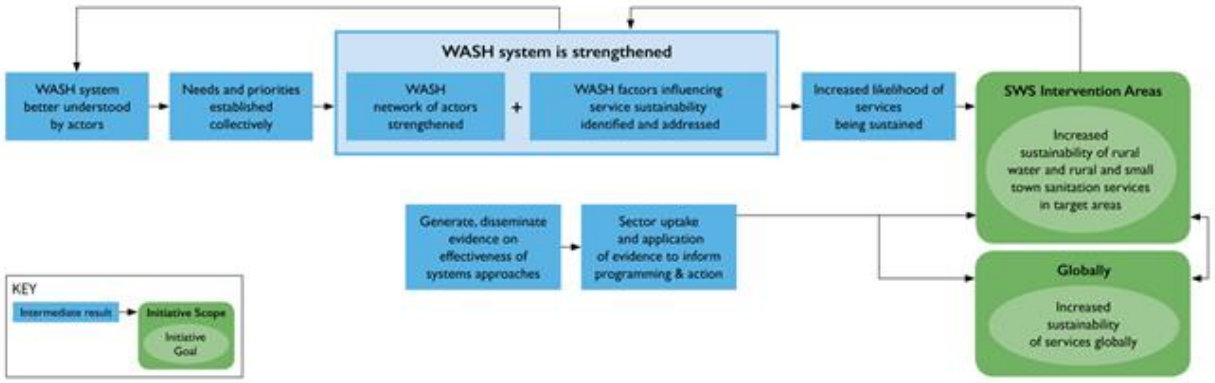


Figure 1. SWS Theory of Change

Specifically, this report identifies and compares the status of:

- Living conditions of Debre Birhan residents and their development priorities (output: Living Conditions Diamond)
- The service delivery environment (output: Shit Flow Diagram or SFD),
- The enabling environment for sanitation and FSM service delivery (output: adapted City Service Delivery Assessment or CSDA).

The report aims to uncover what changed from baseline to endline and to share lessons and possible solutions.

[2] Available at: https://www.globalwaters.org/resources/assets/sws/sanitation-small-towns-debre-birhan-ethiopia-baseline-assessment-report (Accessed June 15, 2021).

Endline Methodology

Tetra Tech deployed the Sanitation Cityscape Approach (SCA)[3] to design the methodology and data collection instruments for the endline analysis. The SCA is a conceptual framing of urban sanitation systems that is used to assess sanitation at a city-wide level, from households to governance and institutional structures. SCA was also used for the baseline assessment in Debre Birhan. The Tetra Tech team trained local enumerators and managed all aspects of instrument sampling, data collection, data entry, data cleaning, and reporting on the data collection process.

Conceptual Approach

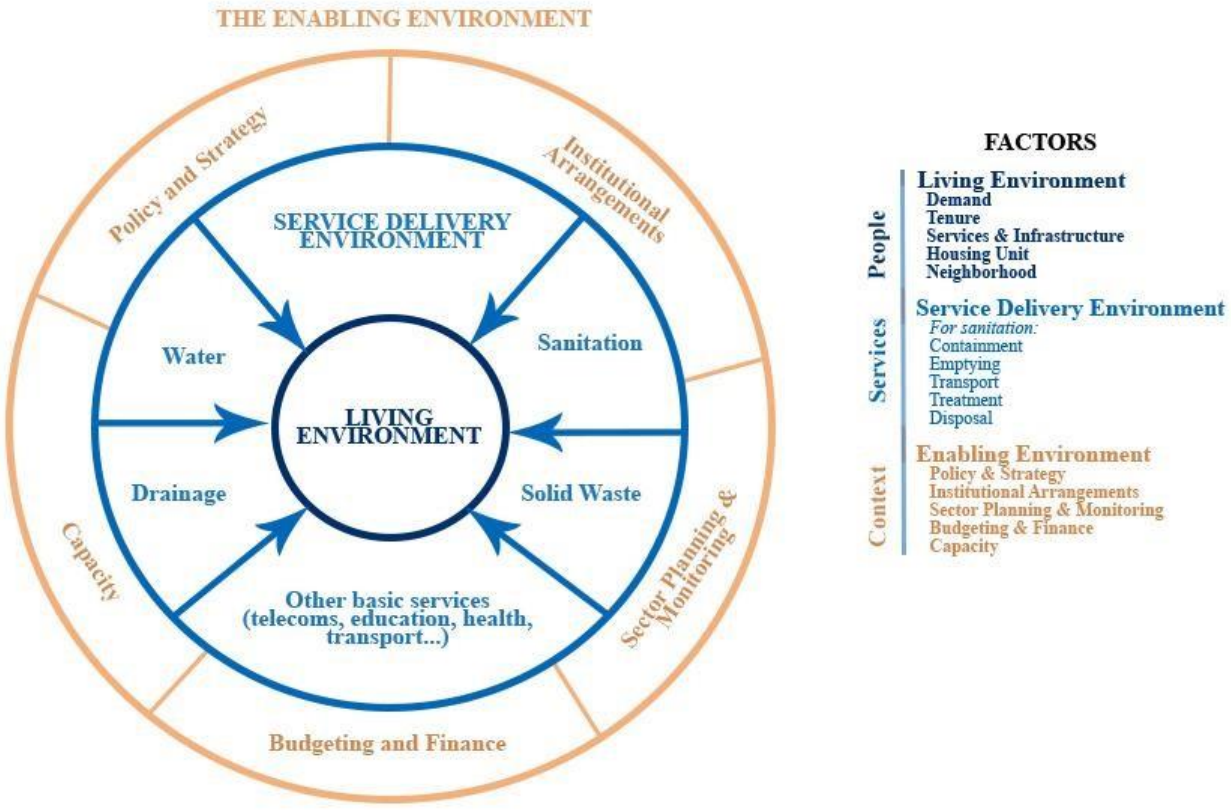


Figure 2. The Sanitation cityscape conceptual framework

The SCA breaks the city into three environments: *the living environment,* which considers indicators at the household level, *the service delivery environment,* which considers indicators that assess sanitation service delivery in the town, and *the enabling environment,* which considers indicators at the governance and institutional level (see Figure 2). The SCA adapts existing diagnostic tools that, when combined, can

[3] Pippa, S. and A. Cotton. 2020. "The Sanitation Cityscape – Toward a Conceptual Framework for Integrated and Citywide Urban Sanitation," *Frontiers in Environmental Science* 8. doi:10.3389/fenvs.2020.00070.

generate a systems view of the city-wide situation, based around 16 indicators. Annex A presents the indicators and scoring system for factors within the three environment types.

The *living environment* presents profiles on tenure, housing stock, residents' perception of their neighborhood, and levels of infrastructure (e.g., if the plot is served by water, electricity, drainage, the level of sanitation access, and if the road immediately outside the plot is paved and lit by streetlights). To understand the living conditions of any urban settlement, the Living Conditions Diamond[4] (LCD) is a useful tool. It describes the living environment of any given settlement, using four variables: tenure, housing unit, infrastructure, and neighborhood. Plotting each variable on an axis, it generates diamond profiles offering an objective comparability between settlement types both within and between urban environments.

The *service delivery environment* profile includes formal and informal sanitation providers across the sanitation service delivery chain, as well as their respective relationships to the municipality. Here the Fecal Waste Flow Diagram (also known as a Shit Flow Diagram or SFD) graphics[5] can be a useful tool to visualize a snapshot of any given sanitation situation in a town. A comprehensive SFD analysis can take several weeks of data collection to prepare. It is often based on best estimates and several assumptions since it is not always possible to determine what is happening under the ground. SFD graphics show a global picture of risk and level of safely managed sanitation in the town. This report presents an initial "light" version compiled with available data; data were more limited at endline than baseline due to the closure of the FSD site.

The *enabling environment* profile includes institutional roles and relationships (stakeholders, sector coordination, service delivery arrangements, and regulation and accountability). It focuses on the city-level environment, notably how national policies and mandates translate at municipal and town levels. The assessment borrows from tools designed to understand the enabling environment such as the Citywide Service Delivery Assessment (CSDA).[6,7] The interfaces and relationships among the living, service delivery, and enabling environments are also analyzed.

Methods

The following data collection tools were used:[8]

- **Household Surveys**: used to gather information on living conditions and the environment, including access to basic services and residents' perceptions and satisfaction around sanitation. Survey data were collected through mWater with a team of enumerators supported by Debre

[4] Gulyani, S. and E. Basset. 2010. "The Living Conditions Diamond: An Analytical and Theoretical Framework for Understanding Slums," *Environment and Planning A: Economy and Space* 42, no. 9: 2201–2219. doi:10.1068/a42520.

[5] "SFD Manual Vol. 1 and 2." Shit Flow Diagram Initiative. Last modified April 2018. Accessed June 15, 2021. https://sfd.susana.org/knowledge/the-sfd-manual

[6] At baseline, the CSDA tool was limited to FSM only and therefore adapted for the purpose of this study. However, it has since been updated to include networked and non-networked sanitation systems.

[7] Blackett, I. and P. Hawkins. "City Service Delivery Assessment for Citywide Inclusive Sanitation – Tool and User Guide." Accessed June 22, 2020. https://www.susana.org/en/knowledge-hub/resources-and-publications/library/details/3700

[8] Focus group discussions, which were part of the baseline, were removed from the methodology to avoid bringing groups of people together under COVID-19 safety measures.

Birhan *kebele* (administrative division or ward) health workers, sanitation officers from the municipality, and Tetra Tech staff.

- **Key Informant Interviews:** used to gather information on the sanitation sector and the enabling environment that frames it from government actors, community groups, NGOs, and representatives of sanitation service providers in Debre Birhan. Tetra Tech conducted interviews using dedicated interview guides for each respondent type (e.g., town administration, kebele administration, sanitation service provider). Learning alliance members who were interviewed completed an additional questionnaire on the learning alliance itself.

- **Transect Walks, Observation, and Site Visits:** used to collect data on the living environment and sanitation service delivery (specifically around the inventory, processes, and volumes for FSM). The Tetra Tech team conducted observation and transect walks with a transect walk record sheet for observations that included five questions asked to passers-by (up to eight) about frequency and location of fecal sludge pollution events and activities. All transect walk respondents live in the community and consider themselves aware of the conditions throughout the year.

Sampling and Respondents

Household Survey: Debre Birhan has a population of 137,966 people (62,379 males and 75,587 females) across nine kebeles, as of December 2020.[9] This represents a 5.76 percent increase from 2018, based on Town Health Administration Office report figures.[10] Tetra Tech sampled 422 households during the endline survey to match the 95 percent confidence level achieved in the baseline report.

Households were sampled from all nine kebeles using a stratified random approach, where the kebele administrative units formed nine distinct strata and proportionate samples were taken from each administrative unit and survey participants were randomly selected within each kebele (see Table 1).

Table 1. Debre Birhan kebele population breakdown

S. N	Name of Kebele	Population			Sample[11]
		Male	Female	Total	Sample/total pop x size of strata
1	Kebele 01	8,399	10,244	18,643	57
2	Kebele 02	6,863	8,986	15,849	48
3	Kebele 03	5,486	6,298	11,784	36
4	Kebele 04	7,955	8,398	16,353	51
5	Kebele 05	4,716	5,920	10,636	33
6	Kebele 06	7,384	9,058	16,442	51
7	Kebele 07	4,628	5,624	10,252	32

[9] Debre Birhan Town Administration Socioeconomic Profile, September 2013.

[10] Debre Birhan Town Health Administration Office report.

[11] Including 10 percent mitigation of desired sample.

8	Kebele 08	7,704	10,242	17,946	55
9	Kebele 09	9,244	10,817	20,061	62
Total		62,379	75,587	137,966	422
Source: Debre Birhan municipal office					

Key Informant Interviews: Key informant interviews were conducted with 21 key sanitation stakeholders in the town (see Annex B). Interviewees represented a broad mix of actors from town sector offices, learning alliance members, kebele administrators, Urban Health Extension Workers (UHEW), development practitioners, the town brewery, and communal and public latrine management bodies. Interviews were conducted with stakeholders at their location.

Transect Walks, Observation, and Site Visits: Transect walks with a record sheet were conducted in the same two kebeles (02 and 06) that were randomly selected at baseline.

Data Collection

The endline assessment took place in the second week of February 2021 under the broader context of the COVID-19 pandemic. To ensure full compliance with the Ministry of Health's COVID-19 prevention and mitigation measures, the team identified potential risks for transmission and developed and implemented a full range of mitigation measures.

Tetra Tech partnered with the town to collect endline data, providing overall supervision. For the household survey, four enumerator teams collected data over 5 consecutive days. Each team consisted of one Tetra Tech enumerator and one UHEW. Two town-level health and municipal office sanitation and beautification officers were assigned to supervise all household data collection, provide technical support, and oversee data quality at the household level. Two SWS team members from Tetra Tech provided training and oversight for the household survey, conducted the 21 key informant interviews, observed service provider practices, and participated in transect walks.

Observations and interviews with service providers proved difficult as private service providers were not available during the data collection period, and DBWSSE restarted operations the final few days of data collection (March 3–4, 2021). Therefore, the data collection team was only able to observe two service providers across the town's sanitation service chains (containment to end use and disposal). Data regarding the previous year's operations was limited to a 3-month period during which time the DBWSSE's emptying services were operational.

Results

Characteristics of Respondents

Table 2 presents the basic demographics of the 422 endline survey respondents, and Table 3 lists the types of sanitation facilities endline respondents used.

Table 2. Basic characteristics of household survey respondents

	Baseline (N=308)	Endline (422)
Gender of survey respondents	Female: 60.8 percent Male: 36.89 percent	Female: 75.6 percent Male: 24.4 percent
Gender of heads of households	Female: 26.6 percent Male: 73.4 percent	Female: 34.6 percent Male: 65.4 percent
Percentage of respondents who were head of household	48.0 percent	43.3 percent
Household size	Median: 5 Average: 8.4	Median: 5 Average: 5
Age of head of household	Average: 51.9 years	Average: 48.8 years
Percentage of respondents with an on-site private toilet	51.1%	57.8%

Table 3. Types of sanitation facilities at baseline and endline

	Baseline		Endline	
Sanitation Technology	Number	Percentage	Number	Percentage
Condominium connection	1	0.32%	11	2.76%
Improved (washable slab) direct pit	88	28.48%	306	72.51%
Pour flush connected to septic tank	1	0.32%	27	6.40%
Pour flush into direct or offset pit	1	0.32%	15	3.55%
Unimproved (traditional slab; damaged or no superstructure) direct pit	33	10.68%	40	9.483%
Non response	185	59.87%	23	5.45%
Total	**309**	**100%**	**422**	**100%**

Less than 1 percent of respondents reported open defecation as their most common sanitation option; however, it is clear from other data sources (transect walks and key informant interviews) that open defecation is practiced, often at night, and takes place around public latrines. Household sanitation facilities in Debre Birhan are typically concrete slabs with an open drop hole to a dry pit or tank below; covers and lids are uncommon. Pour-flush toilets exist in condominium housing built under the Ethiopian government's low-cost housing program.

Living Environment

Sanitation is not perceived as a development priority for residents of Debre Birhan. Overall, many residents are satisfied with their current sanitation situation, with other issues such as roads and gray water management being more pressing.

Endline findings for the living environment were drawn from analysis of the household surveys (see Figure 3). The SCA uses the LCD tool[12] to provide an overview of the living environment of any given location. The LCD tool uses four factors to describe the living environment: tenure, housing unit, infrastructure, and neighborhood. This is worked out as percentages of potential total coverage, where 100 percent represents the "ideal" neighborhood. In addition, analysis of the living environment seeks to understand what urban residents want, their priorities, and their demand for basic services.

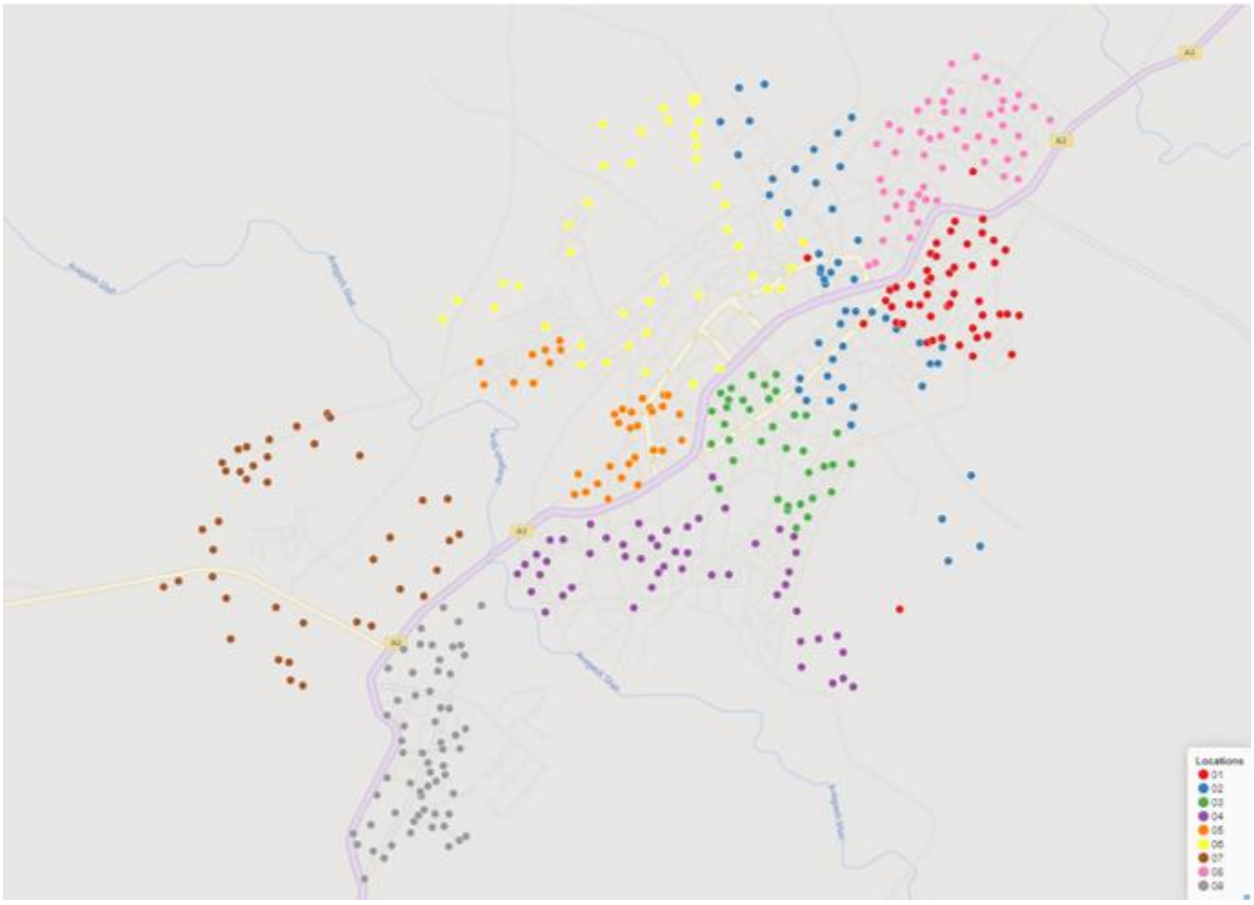


Figure 3. Household survey Debre Birhan endline

[12] Gulyani, S. and E. Basset. 2010.

Demand for Basic Services

A representative sample (N=422) of residents were asked an open-ended question to identify the most important development need in their neighborhood at baseline and endline. The top six development priorities identified from the endline survey were: roads, household gray water drainage, streetlights, stormwater drainage, solid waste management, and toilets. Roads and household gray water drainage were a higher priority than at baseline (see Table 4) with paved roads ("cobblestone") being the top priority for 32.9 percent of the surveyed population. Household drainage of gray water — defined by enumerators as water from washing dishes, laundering clothes, or bathing, but not including toilet effluent —was the second highest priority (18.7 percent). Households typically discharge their gray water to open ground or a roadside ditch or channel; however, due to the geology of the town and relatively high water table (3–5 meters) infiltration can be slow.[13] Other commonly cited resident priorities included streetlights (15.2 percent), water drainage (14.7 percent), and solid waste management (13.3 percent) (see Figure 4).

Table 4. Residents' development priorities

	Baseline 2018	Endline 2021	Difference	
Road	15%	33%	▲	18%
Household (gray water) drainage	9%	19%	▲	9%
Streetlights	16%	15%	▼	-1%
Rainwater drainage	19%	15%	▼	-5%
Solid waste management	11%	13%	▲	2%
Toilets	11%	1%	▼	-10%

[13] Ministry of Water, Irrigation, and Energy Situation Assessment Study and Preparation of Urban Wastewater Development Plan (2019), Federal Democratic Republic of Ethiopia.

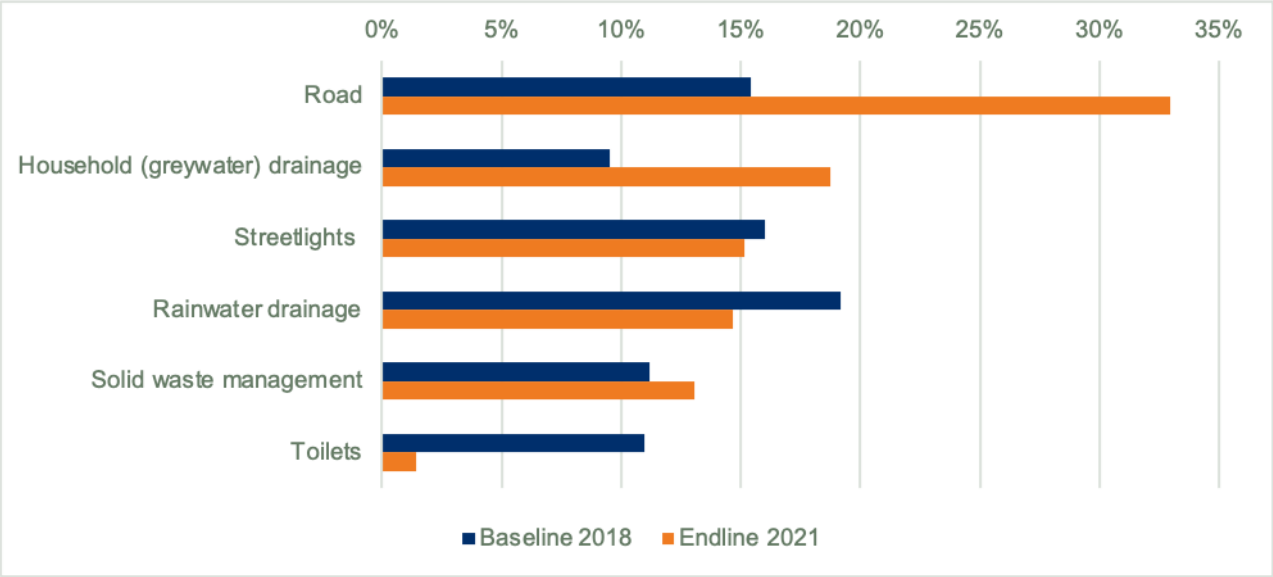


Figure 4. Debre Birhan residents' top development priorities

The endline also asked three kebele administrators and three UHEWs what the development needs were in their respective communities. Their perspective was slightly different from the residents, with solid waste management, communal toilets, and street lighting cited as priorities (see Table 5).

Table 5. Top development priorities as listed by kebele administration and UHEWs[14]

	Solid Waste Transfer Center	Communal Latrine	Streetlight	Drainage	Public Latrine	Emptying Service and FSD	Other
Kebele Admin 1	✓	✓	✓		✓		Master Plan
Kebele Admin 2	✓	✓	✓		✓		Sewerage
Kebele Admin 3	✓		✓	✓			Road
UHEW 1		✓		✓		✓	Health post
UHEW 2	✓	✓	✓	✓	✓		
UHEW 3	✓	✓	✓	✓		✓	

[14] The numbering is anonymized and does not indicate any reference to the kebele numbers.

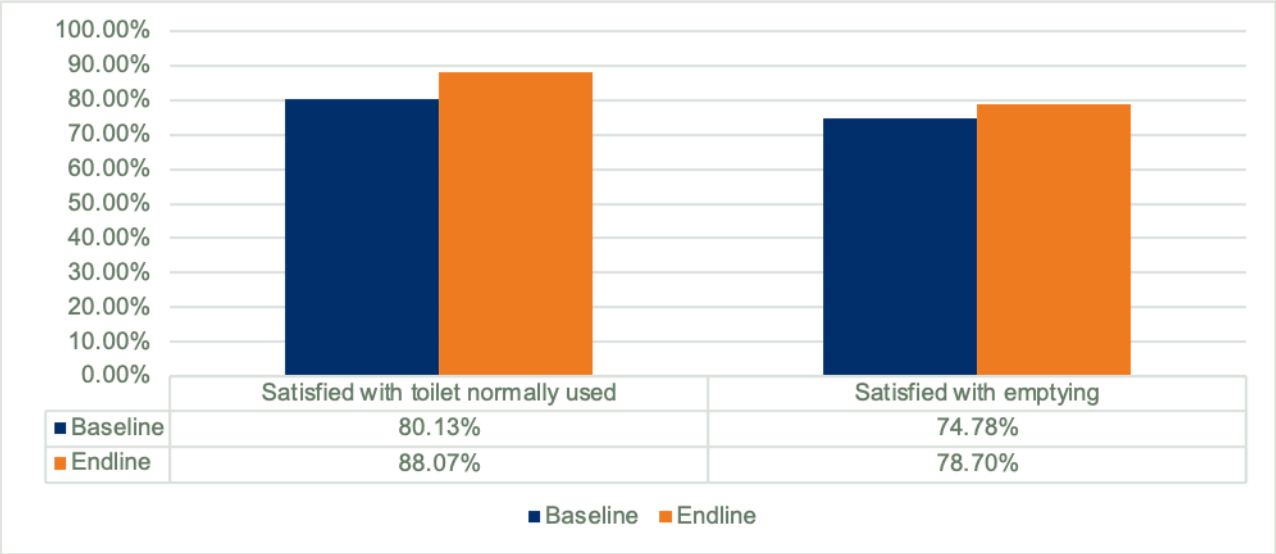


Figure 5. Household satisfaction with sanitation comparison baseline vs. endline

In terms of residents' satisfaction with their existing sanitation services, the endline observes a slight increase in reported satisfaction levels for both toilets and emptying services (see Figure 5).

Tenure

The tenure axis of the LCD is a proxy indicator drawn as a composite of the percentage of owner occupiers, the length of stay, and fear of eviction in any settlement where tenure is understood as a settlement social function on a continuum of rights, rather than any one discrete variable.[15] The "tenure mix" can reveal the lack of investment in slums;[16] areas with high numbers of absentee landlords are likely to produce a compound lack of investment as little capital is reinvested into the housing stock or accrued through taxation. A similar logic affects household spending on sanitation as tenants are less likely to invest in sanitary infrastructure.[17] The tenure mix can provide information on the types of sanitation services that might be appropriate and is an indicator of housing stock.

Sixty-eight percent (N=422) of respondents were owner occupiers with the highest proportion of tenants found in Kebele 02. Of these respondents, 6.65 percent had a legal title and 31 percent did not fear eviction. Sixty-eight percent of the tenant households (N=66) had absent landlords (i.e., their landlord did not live in the same plot). Overall, the tenure indicators were higher at endline compared to baseline (see Figures 6–9).

---

[15] Bazoglu, N. 2011. *Monitoring Security of Tenure in Cities: People, Land, and Policies.* Nairobi, Kenya: United Nations Human Settlements Programme.

[16] Gulyani, S. and D. Talukdar. 2008. "Slum Real Estate: The Low-Quality High-Price Puzzle in Nairobi's Slum Rental Market and Its Implications for Theory and Practice." *World Development* 36, no. 10: 1916-1937. doi:10.1016/j.worlddev.2008.02.010.

[17] Scott, P., A. Cotton, and M.S. Khan. 2013. Tenure Security and Household Investment Decisions for Urban Sanitation: The Case of Dakar, Senegal, Habitat International.

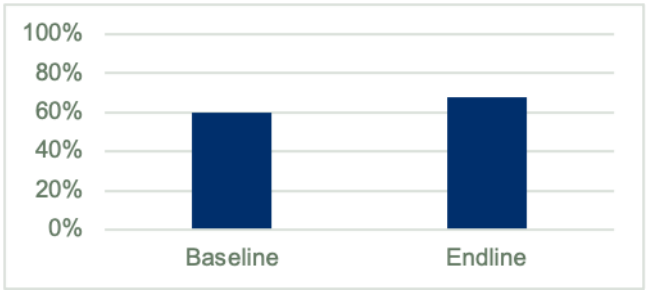


Figure 6. Percentage of owner occupiers' baseline vs. endline

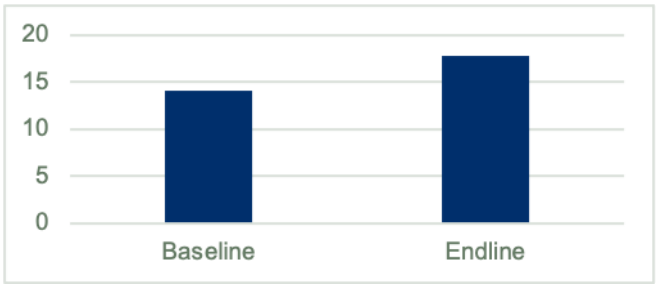


Figure 7. Duration of stay in neighborhood (years) baseline vs. endline

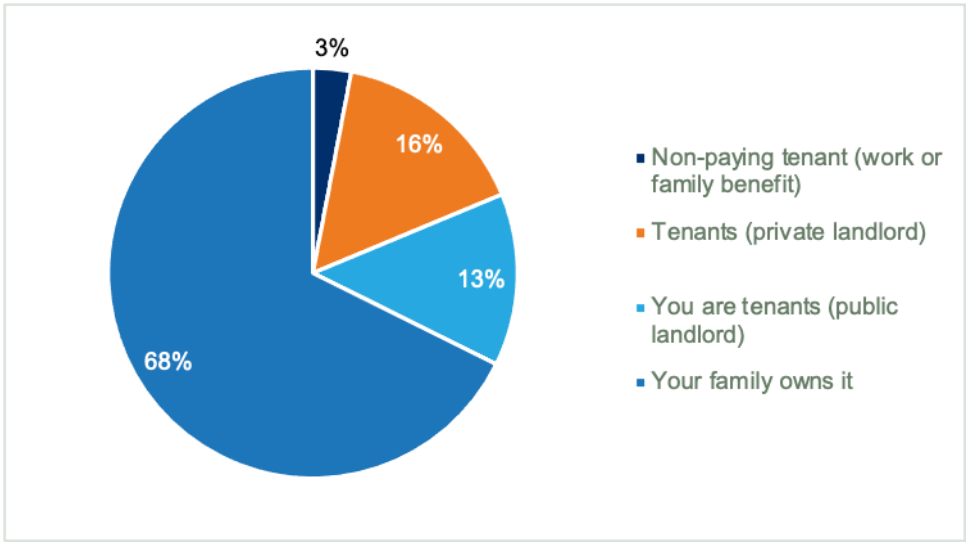


Figure 8. Tenure status endline

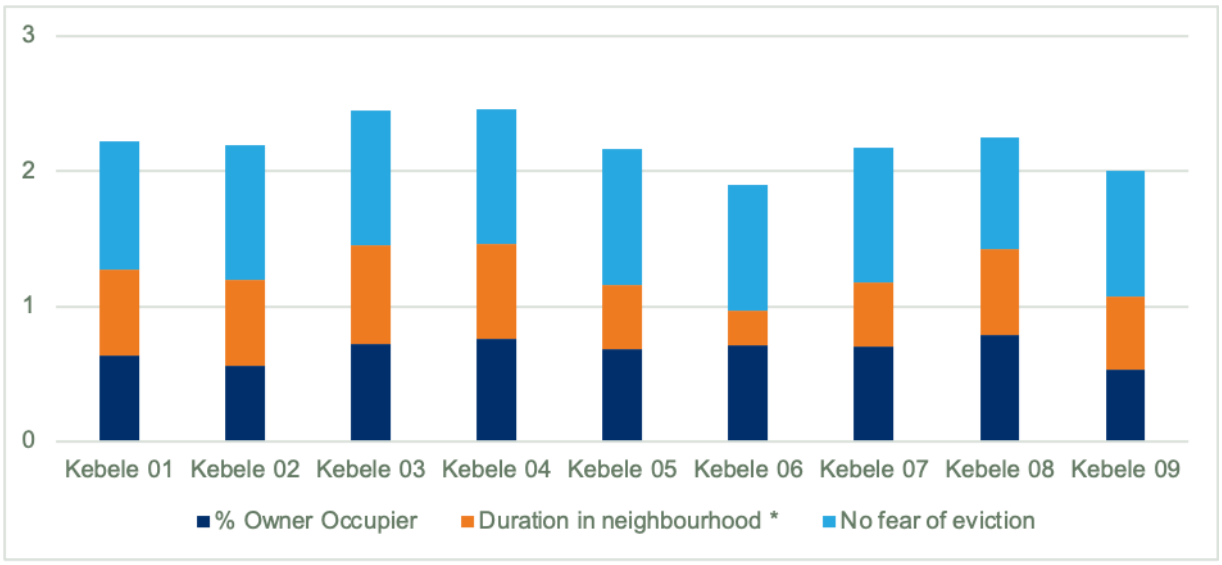


Figure 9. Endline tenure proxy composite indicators

The Housing Stock

The housing axis is a percentage of the number of houses with finished material as their main material of walls, floor, and roof (as defined by the UNICEF Multiple Indicator Cluster Survey) in any settlement. Fifty-six percent of endline survey respondents had permanent floor materials, 45 percent had permanent roof material, and 56 percent had permanent wall materials (see Figure 10). A permanent roof can be used as a proxy for housing investment.[18] Kebeles 02, 05, and 06 made up less than 10 percent of the respondents with permanent roofs. Overall, housing stock across all categories was lower at endline than at baseline. Reasons for this could be either a difference in data collection or an actual difference in housing stock between baseline and endline; the latter could be explained by town growth, which is estimated at 2.88 percent per year (however, this growth may be reversed by COVID-19 population migration dynamics that are not yet captured in the data).

[18] Payne, G., A. Durand-Lasserve, C. Rakodi, C. Marx, M. Rubin, and S. Ndiaye. 2008. "Social and Economic Impacts Oo Land Titling Programmes in Urban and Peri-Urban Areas: International Experience and Case Studies of Senegal and South Africa." Oslo and Stockholm: SIDA and Norwegian Ministry of Foreign Affairs.

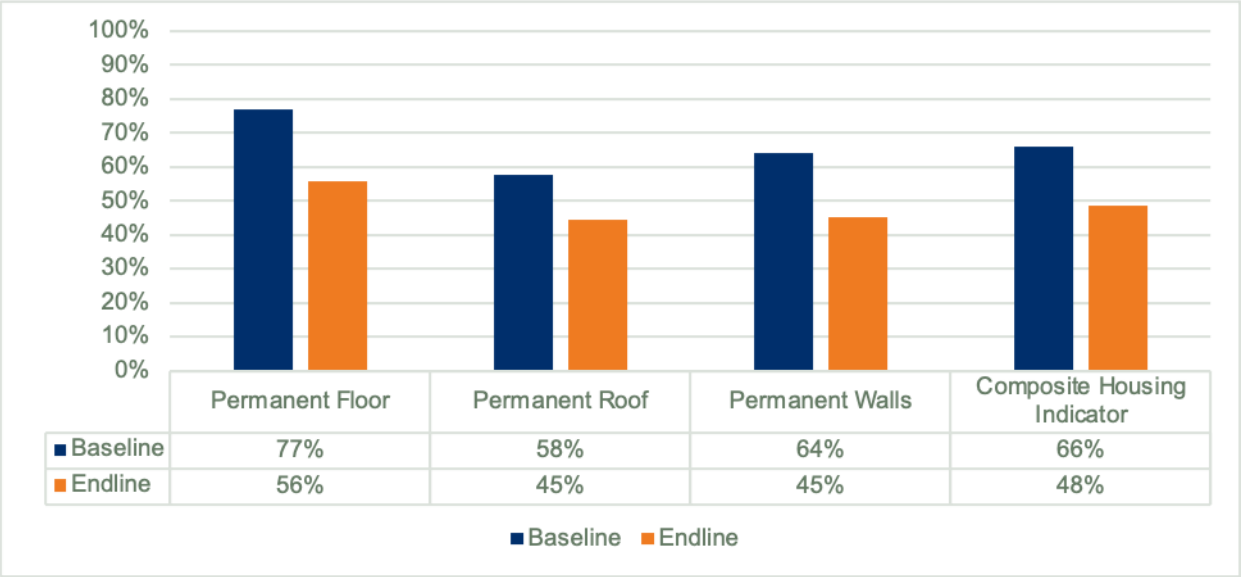


Figure 10. Housing stock comparison

Infrastructure

The infrastructure axis is a composite percentage of the number of houses with electricity to plot and drains outside plot, paved roads outside plot street lighting, garbage disposal service, improved private sanitation, and water piped to plot. Overall, the survey found a marginal increase in collective infrastructure indicators from 48 percent at baseline to 53 percent at endline. This is largely driven by a change in respondent coverage of drainage and, to a lesser extent, solid waste management and streetlights (see Figure 11). It is important to note that the soil type is rocky, which presents substantial engineering challenges to underground infrastructure.

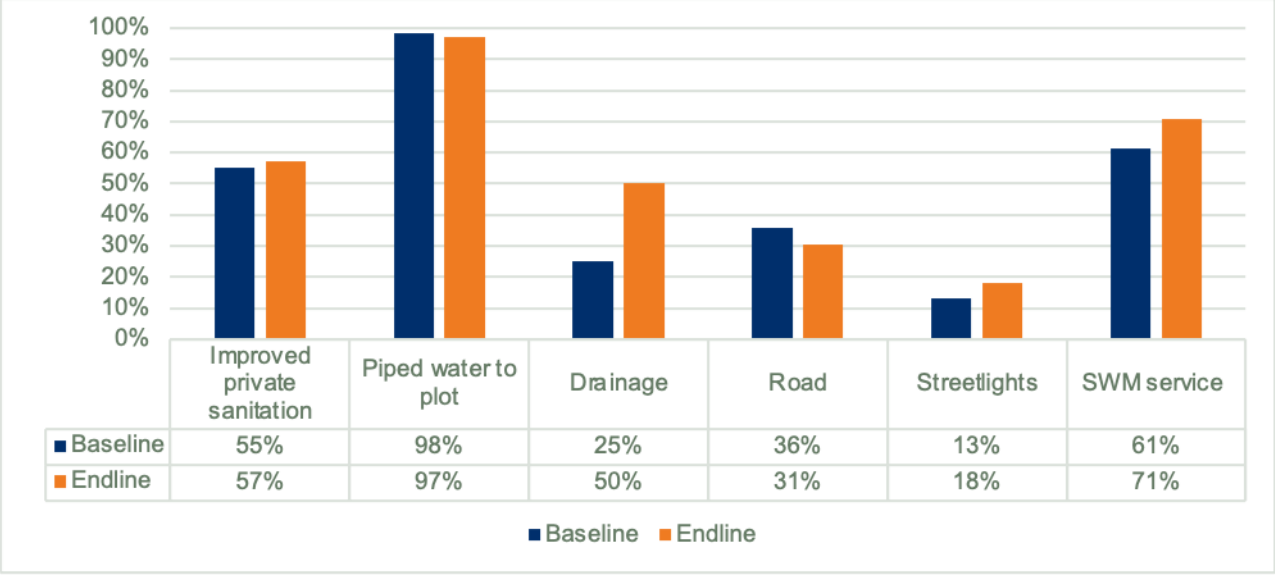


Figure 11. Infrastructure comparison

Perception of the Neighborhood

The neighborhood axis is a composite percentage of residents' good perception of the cleanliness, location (with respect to access to roads and transportation), and safety of their neighborhood. Overall, there was a drop in respondents' perception of the city between baseline and endline with the most significant drop in how residents perceived their location with respect to town amenities (see Figure 12). The perception of neighborhood cleanliness also decreased from baseline to endline. Only 25.8 percent of surveyed respondents said they thought their neighborhood was clean, with the lowest scores in Kebele 05 (5.7 percent) and 08 (7.6 percent) and the highest score in Kebele 01 (52.0 percent). A possible reason for this is that neighborhoods are in fact less clean; however, this is contradicted by an increase in solid waste management services. Another explanation is that residents' perception of neighborhood cleanliness has decreased, which could also be explained by greater awareness around the solid waste problem. If the latter is true, this lower perception could be considered positively and as a potential mechanism to trigger changed behavior.

Figure 12. Perception of neighborhood comparison

The Living Conditions Diamond for Debre Birhan

To populate a LCD for the nine kebeles of Debre Birhan, each of contributing factors for the four axes (tenure, infrastructure, housing, and perception of neighborhood) are represented as a percentage composite and plotted on a spider diagram axis.

Figure 13 presents the LCDs for endline and baseline for comparison. It shows infrastructure and tenure are largely unchanged, but housing stock and residents' perception of the neighborhood have decreased. Figure 14 presents the LCDs for the individual kebeles at endline, where the important item to note is that it is Kebeles 02 and 05 (as baseline) that break the pattern with markedly lower LCD profiles compared to the others. Low-income and tenant households are unlikely to invest in sanitation

hardware but may pay additional rent for a toilet[19,20]or be willing to pay for service-based sanitation options[21] (i.e., well-managed commercial public toilets, communal sanitation, and potentially container-based sanitation solutions[22]). This was the same at baseline.

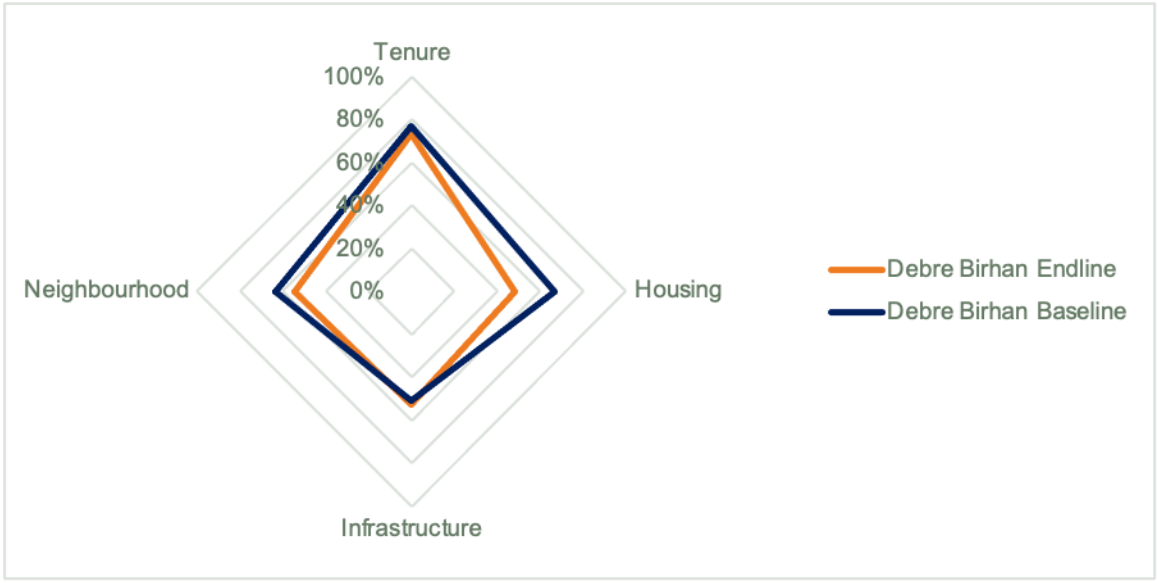


Figure 13. Living Conditions Diamond Debre Birhan baseline and endline comparison

[19] Gulyani S., E. M. Bassett., and D. Talukdar. 2012. Living Conditions, Rents, and their Determinants in the Slums of Nairobi and Dakar. Land Economics: 88 (2), 251–274.

[20] Tidwell J. B. F. Terris-Prestholt, M. Quaife, R. Aunger. 2019b. Understanding Demand for Higher Quality Sanitation in Peri-Urban Lusaka, Zambia Through Stated and Revealed Preference Analysis. *Social Science & Medicine*: 232, 139–147. doi:10.1016/j.socscimed.2019.04.046.

[21] Scott, P., A. Cotton, and M. Sohail Khan. 2013. "Tenure Security and Household Investment Decisions for Urban Sanitation: The Case of Dakar, Senegal." *Habitat Int.*: *40*, 58–64.

[22] Container based sanitation has been implemented for niche segments of urban populations lacking other sanitation solutions. See Stip, Clementine Marie, Seema Thomas, and Martin Gambrill. "Container-Based Sanitation: One Way to Reach the Last Mile for Sanitation Services." *The Water Blog* (blog). *The World Bank Group, Global Water Practice.* February 19, 2019. https://blogs.worldbank.org/water/container-based-sanitation-one-way-reach-last-mile-sanitation-services.

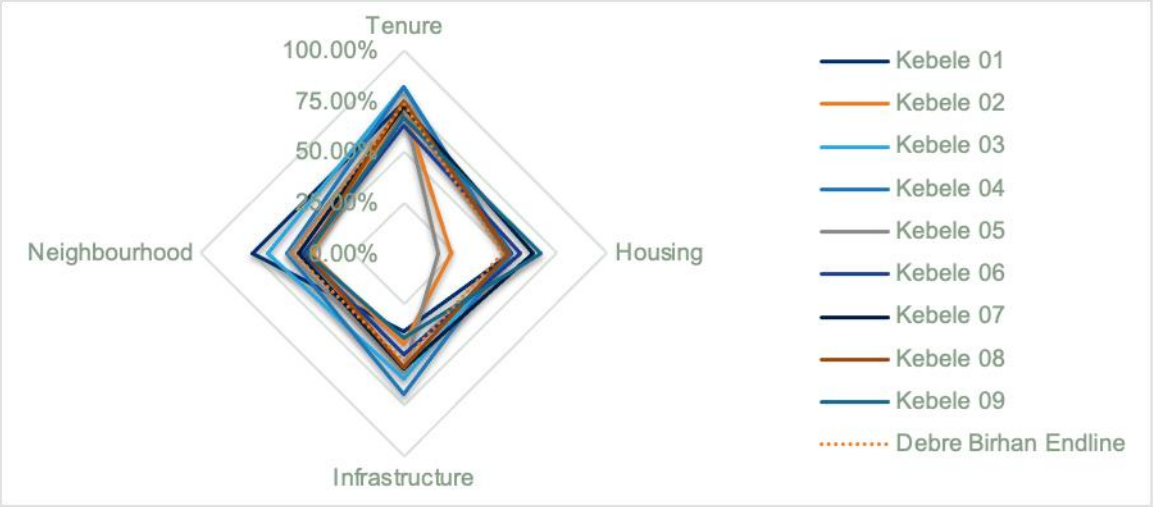


Figure 14. Living Conditions Diamond Debre Birhan endline

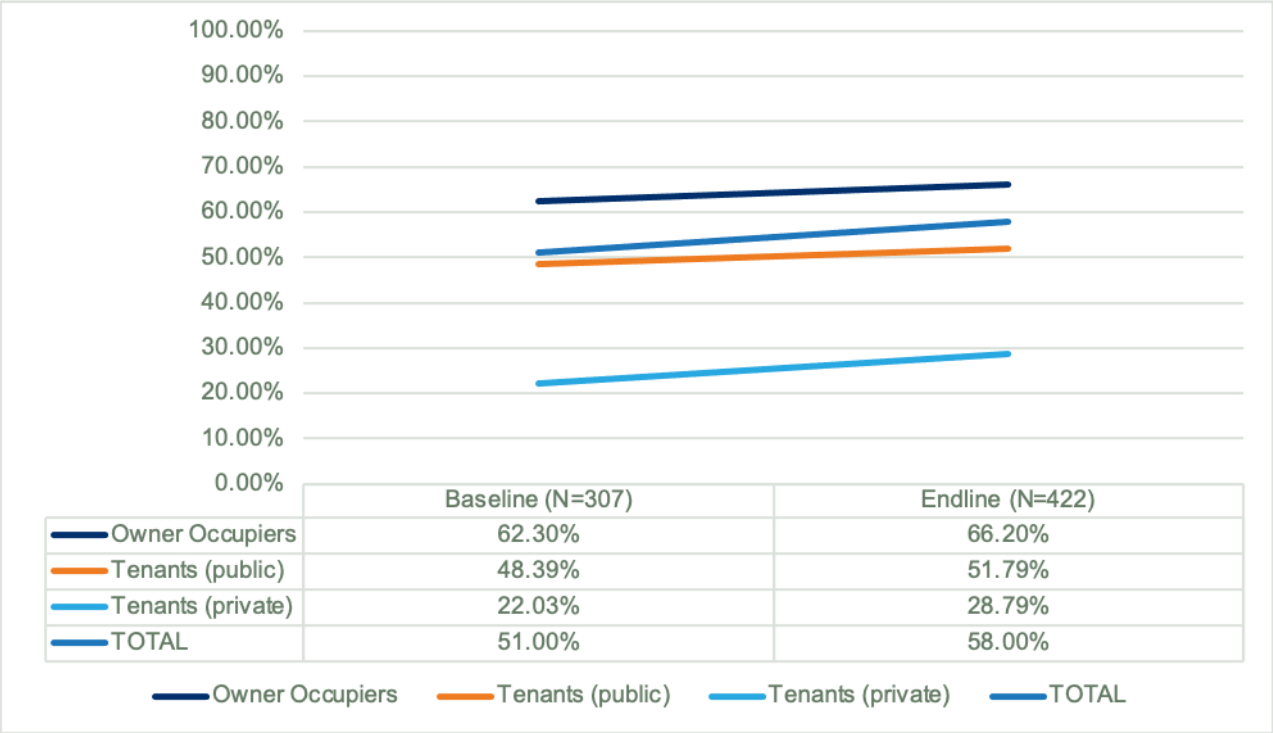
Service Delivery Environment

With DBWSSE emptying services suspended due to the lack of a disposal site, the cost of emptying increased for users, both households and public and communal latrine operators. The risk of unsafely managed sanitation identified at baseline due to lack of treatment was found to have shifted at endline to a more localized issue of fecal waste not reaching a dedicated site due to closure of the disposal site.

Endline findings for the service delivery environment were drawn from analysis of key informant interviews (N=21), the household survey (N= 422), observation of the sanitation service providers' operations, and two transect walks in kebeles 02 and 06.

Containment

Of the endline survey respondents (N=422), 58 percent had an on-site private toilet, 36.8 percent shared an on-site toilet with another family, and 4.5 percent used communal latrines. The endline figures are marginally higher than baseline (see Figure 15) across all groups but this change is not considered statistically significant.



	Baseline (N=307)	Endline (N=422)
Owner Occupiers	62.30%	66.20%
Tenants (public)	48.39%	51.79%
Tenants (private)	22.03%	28.79%
TOTAL	51.00%	58.00%

Figure 15. Change in access to domestic access to private sanitation

As in the baseline, tenant households at endline were found to be more likely to share toilet facilities than owner occupiers (see Figure 16).

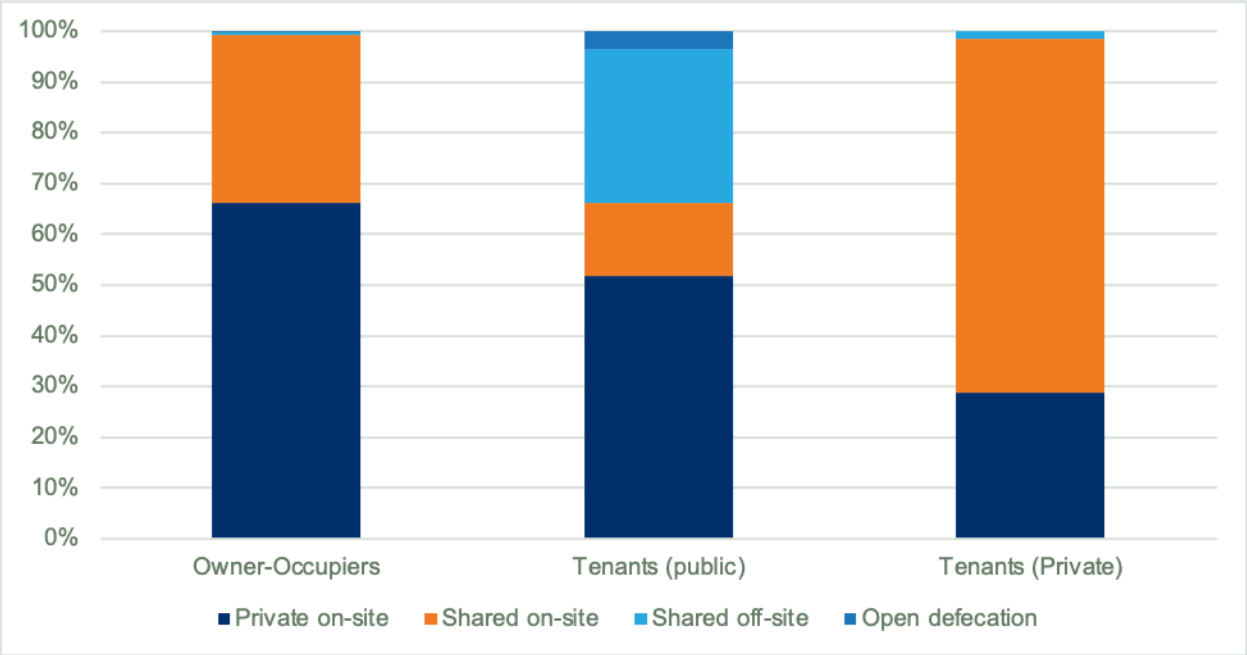


Figure 16. Endline sanitation options by tenure status

Key informant interviews with town UHEWs (N=3) revealed that the issue of hotels, restaurants, cafes, and some households connecting gray and black water to town drainage networks is persistent. Open defecation, illegal connections, and dumping of fecal waste into rivers and farmland is also acknowledged, and the interviews cite limited enforcement of these practices. Domestic gray water and solid waste management remain a challenge with indiscriminate dumping of solid waste on wasteland or unused plots in the neighborhoods and/or clogging drainage channels.

The transect walks in both kebeles 02 and 06 revealed some challenges around sanitation and fecal waste management as follows (also see Table 6):

- Kebele 02 has a reputation of being one of the poorest kebeles in Debre Birhan. It is one of the older kebeles, with some commercial activities, dense occupation, and small alleyways and streets.

- In Kebele 02 visible standing blackwater close to homes was observed close to a condominium building[23] and this was described as a daily occurrence by community members (passersby) interviewed during the transect walk. There was also evidence of open defecation and illegal dumping of waste. Piles of solid waste were accumulating in many sites, close to where people live and work, at times obstructing drainage channels.

- In Kebele 06, gray water management was highlighted as a strong priority at baseline. At endline, visible standing blackwater close to homes was observed. Its source is leakage of effluent from septic tanks that collect gray and black water from condominium buildings. Solid waste has accumulated in the stormwater drainage line, blocking it. No evidence of open defecation or dumping of fecal waste was observed.

Table 6. Transect walk findings Kebele 02 and 06

Transect Walk Question	Kebele 02	Kebele 06
Which of the following might happen in this community? ☐ Open defecation ☐ People throwing feces out with solid waste ☐ Overflowing latrines ☐ Latrines emptying into drains (illegal connection to the drainage from hotels and restaurants) ☐ Uncontrolled latrine emptying by households	✓ People throwing feces out with solid waste ✓ Latrines emptying into drains ✓ Uncontrolled dumping of fecal sludge	✓ Over-flowing latrines ✓ Latrines emptying into drains (illegal connection to the drainage from hotels and restaurants)

[23] There are seven blocks of condominium apartment sites in the town where septic tanks collect the wastewater at ground level.

☐ Spills of fecal sludge during emptying or transport ☐ Uncontrolled dumping of fecal sludge		
Where?	✓ Drain ✓ River stream ✓ Solid waste dump site ✓ Generally scattered throughout the area	✓ Drain ✓ River stream
How often?	✓ Every day (i.e., all the time) ✓ During the rainy season	✓ Every day (i.e., all the time) ✓ During the rainy season

Emptying

Twenty-six percent of endline survey users of private on-site sanitation facilities have never had their tank emptied (compared to 34 percent at baseline). The median value for domestic emptying is every 2 years, which is the same as the baseline (see Table 7).

Table 7. Annual frequency of household tanks emptying at endline

Annual frequency of household tank emptying	Endline Count
1	19
2	12
3	7
4	5
5	2
More than 5	16
Total	61
Median emptying frequency	Every 2 years

The most common emptying method at endline was via vacuum truck, with private companies being the more commonly used service provider (52 percent of all emptied pits) (see Figure 17). This is a significant change from the baseline where 72 percent of respondents reported using DBWSSE, the water utility, for this service. DBWSSE stopped providing emptying services as the FSD site was closed. Six percent of respondents who emptied their on-site systems (N=108) emptied their tank manually, which is similar to baseline (5 percent) (see Figure 17). The reasons given for choosing one emptying service over another was availability (49 percent) and price (24 percent). DBWSSE has suspended its emptying services intermittently since baseline due to the disposal site being closed. In the last 12 months, DBWSSE provided emptying services from April to June 2020 before closing; resuming again in

March 2021. At the time of the data collection, services were restarting and DBWSSE had a list of 250 registered households waiting for emptying over the previous 3 months.

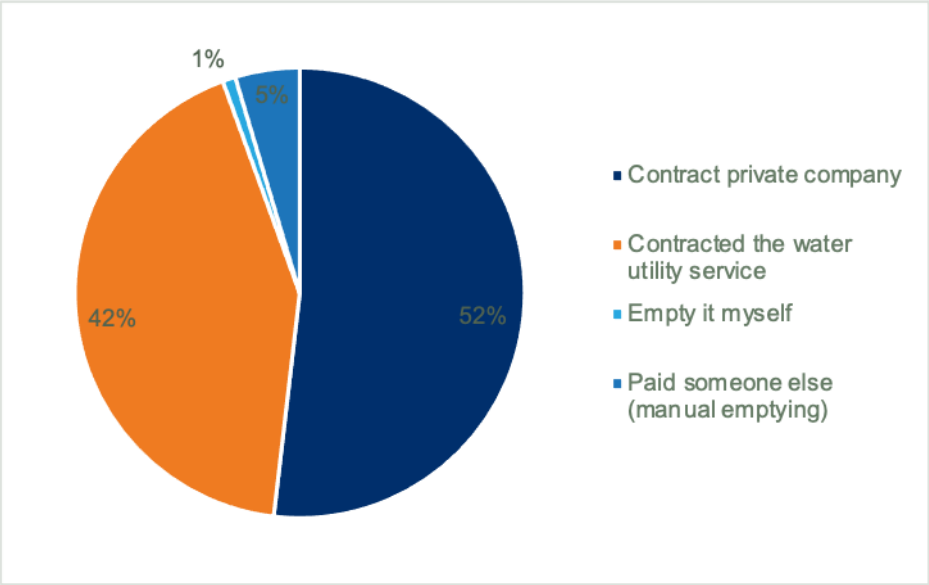


Figure 17. Endline domestic emptying method

The costs households are paying for emptying services increased at endline (see Figure 18). The fixed price for DBWSSE emptying at endline was 800 Ethiopian birr (ETB) (approximately $20) compared to 400 ETB ($14.60) at baseline — representing a 36 percent increase (in U.S. dollars [USD]). In some cases, an additional 300 ETB ($7.45) is charged for manual removal of detritus before the vacuum tanker is used. At baseline, private sector companies charged 600–700 ETB ($22–25). At endline, the cost households paid for emptying ranged from 500–4,000 ETB ($12–$99) with a median of 1,200 ETB ($29) — representing an increase of 36 to 296 percent (in USD). It is important to note that these are self-reported amounts from the households who sometimes do not differentiate between private sector and DBWSSE providers (see Table 8). Also, according learning alliance meeting notes, the likely minimum charge for emptying from the private sector would be 1,500 ETB ($34) per vacuum tanker load so figures less than that are likely to represent a shared cost between multiple households. Increased emptying costs were also validated through key informant interviews with public and communal latrine operators (see Public and Communal Toilets section).

Figure 18. Emptying prices at baseline and endline

Table 8. Household contributions for emptying by method

	Median price ETB	Median price USD
Median private vacuum tanker	1,600[24]	39.70
Median public vacuum tanker	850	21.10
Median manual emptier	800	19.90

Transport

At endline DBWSSE had two vacuum tankers for fecal sludge removal, each with a capacity of 8 m.^{3} Each truck has a driver plus two additional crew. Each truck has a maximum capacity of two trips each day (the distance to the disposal site was noted as a limiting factor for the number of trips per day). At the time of data collection only one was operationally functional.

The baseline analysis (based on 2016–2017 figures) estimated that 4,864 m^3 of fecal sludge was removed from residential properties by DBWSSE in Debre Birhan, compared to 1,344 m^3 in 2019–2020 (see Table 9). The significantly lower volumes collected at endline were because DBWSSE suspended their fecal sludge management services for several months as the disposal site was closed (see Section Treatment and Disposal section). During the time DBWSSE's services were suspended, the private sector continued to operate, providing emptying service for communities, public organizations, and business institutions. They either transported waste to another town or discharged it on farmland and around rivers. Several private sector emptiers were contacted to participate in the endline study but

[24] Prices under 1,500 ETB are likely to be shared costs with others; however, overall the prices of emptying have increased (see Figure 16).

they declined, therefore, the data on their activities are limited to reports of other KIIs. Without primary data from the private sector or the disposal site it is difficult to determine how much of the DBWSSE domestic market is being picked up by the private sector. However, assuming an additional 3,520 m^3 of fecal sludge was removed by the private sector (i.e., the shortfall compared to baseline), some of this waste may have been transported to another town's fecal sludge disposal site. It is also likely some was dumped into local rivers and farmland.

Table 9. Estimations of fecal sludge emptying trips and volumes removed

Domestic Fecal Sludge (Annual)			
	Number of trucks	Estimated number of trips	Estimated annual volume of fecal sludge (m^3)
DBWSSE (baseline, based on 2016–2017 data)	2	608	4,864
DBWSSE (endline)	1 (+1 out of service)	168[25]	1,344

Treatment and Disposal

The FSD site that was in use at baseline closed in 2018. In 2020, Debre Birhan town administration and DBWSSE opened a fecal waste disposal site 13 km outside of town comprising engineered infiltration trenches. This is a different location to the disposal site that was in use at baseline, which was in Kebele 07. It has dedicated trenches to receive liquid waste from the town breweries and domestic fecal waste; however, in practice this segregation of liquid waste is not adhered to, resulting in the site quickly reaching capacity and causing nuisance to local residents. The new site operated for 3 months, closing in July 2020 due to reaching capacity, with town brewery effluent being disposed into all trenches and complaints from the nearby communities following leakage into the surrounding environment. This was similar to why the first FSD reached capacity and closed. When the site closed, DBWSSE ceased providing an emptying service to households. The town FSD site reopened again in March 2021.

The second fecal sludge disposal site was a focal topic of the learning alliance. The learning alliance served as the mechanism to broker agreement and promote community buy-in to build FSD sites quickly because most key players were members of the learning alliance working group. Learning alliance members also worked with additional stakeholders, such as officials, kebele administrators, and the farmers who owned the land identified for FSD sites. Dashen and Habesha breweries were engaged early in the process. The utility's deputy manager played an important role by convincing the breweries to donate funds to cover the costs of: (1) compensation to the farmers for the site, (2) construction of the site's access road, and (3) the town's sanitation campaign. Community pressure and the urgency of the situation also played a role in spurring the learning alliance to act quickly.

The outcomes of these activities resulted in:

[25] Assuming one truck operating for 3 months of the year (based on 2020) with two trips each day.

- Co-financing for the FSD site: In 2019 and 2020, the municipality allocated ETB 532,225 ($12,182) to construct a solid waste transfer station, a designated landfill for solid waste, and to pay for land compensation. Additional funds were drawn from the water utility and Dashen and Habesha breweries (see Budgeting and Finance section).
- Secured land for FSD: Identifying new FSD sites proved challenging for Debre Birhan after the closure of their old disposal sites. Through the learning alliance working groups, and continuous discussion and interventions, both towns secured land for construction of the new FSD sites.

Table 10. Systems-strengthening factors and actors for FSD activities with the learning alliances

Systems components	Approaches	Factors		Actors	
		Factors for system strengthening	Findings	Actors for system strengthening	Findings
FSD site identification	• Learning alliances • High-level meetings • Capacity building • Research for evidence-based planning • Learning visits and adaptation	• Sanitation is not a priority for decision-makers • Financial constraints • Lack of land • Weak coordination • Low capacity • Weak implementation of rules and regulations	• Stakeholder consensus built • Land for FSD site secured • Budget for sanitation increased • Land compensation paid • FSD site construction started • Sanitation included in stakeholders' annual plan • Coordination improved	• Municipality • Water Utility • Health • Environment Protection Forest and Climate Change Authority • Finance • Tourism and Culture • Breweries • Vacuum truck operators	• Sanitation (FSD) and shared latrine discussed by decision-makers • Knowledge and attitude of stakeholders improved • Potential stakeholders identified • Regular learning alliance meetings conducted • Member participation increased

Reuse

No reuse activities were identified during the endline, which is the same as at baseline.

Initial SFD Graphic

Figure 19 presents the SFD 2020 graphic, and Table 10 provides the estimates and assumptions that were used to generate this graphic. The hospital, university, prison, and hotels are not factored into this SFD analysis. For reference, all of these omitted organizations rely on septic tanks (10 hotels, by means of a sewer connection connected to a large septic tank). Several hotels in the town have been identified as discharging fecal waste to drainage channels. If these data were captured in the SFD, it would show an additional waste stream that was not being safely collected or managed in the town.

The bottom-line figures of the amount of safely managed sanitation in Debre Birhan across the two SFDs suggest the sanitation situation has improved. These figures should be interpreted with caution since there was a 9 percent decrease of households reporting their on-site facilities are being emptied.

Assuming the on-site containment systems will fill at the same rate from one year to the next, this may indicate an underreporting of domestic emptying practices in the absence of the DBWSSE emptying service, where either households are not reporting other forms of emptying (such as open to drain or manual emptying). This discrepancy would show up in the 2020 graphic as green (safely managed), which may not be the case. However, we can use these SFD graphical representations to understand the topline issues. Comparison of baseline and endline SFDs (see Figures 18–19) show a clear shift of sanitation risk from the city (where the most significant area of risk was around lacking treatment) to fecal waste not reaching a dedicated site. This is significant as it represents the risk being closer to residents, and potentially being discharged locally to farmland and rivers. A more comprehensive analysis would be required to validate the inherent assumptions and figures, which is beyond the scope of this study.

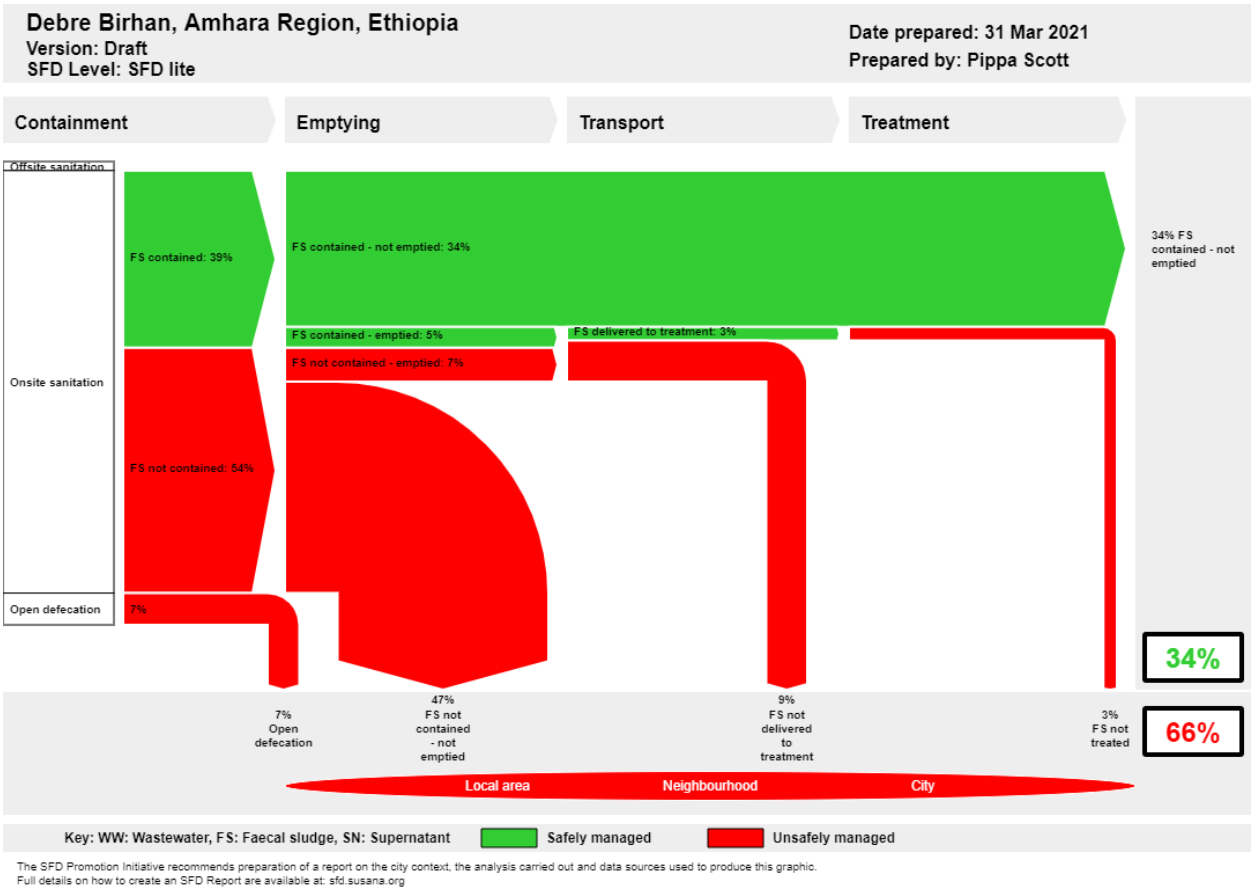


Figure 19. Endline SFD

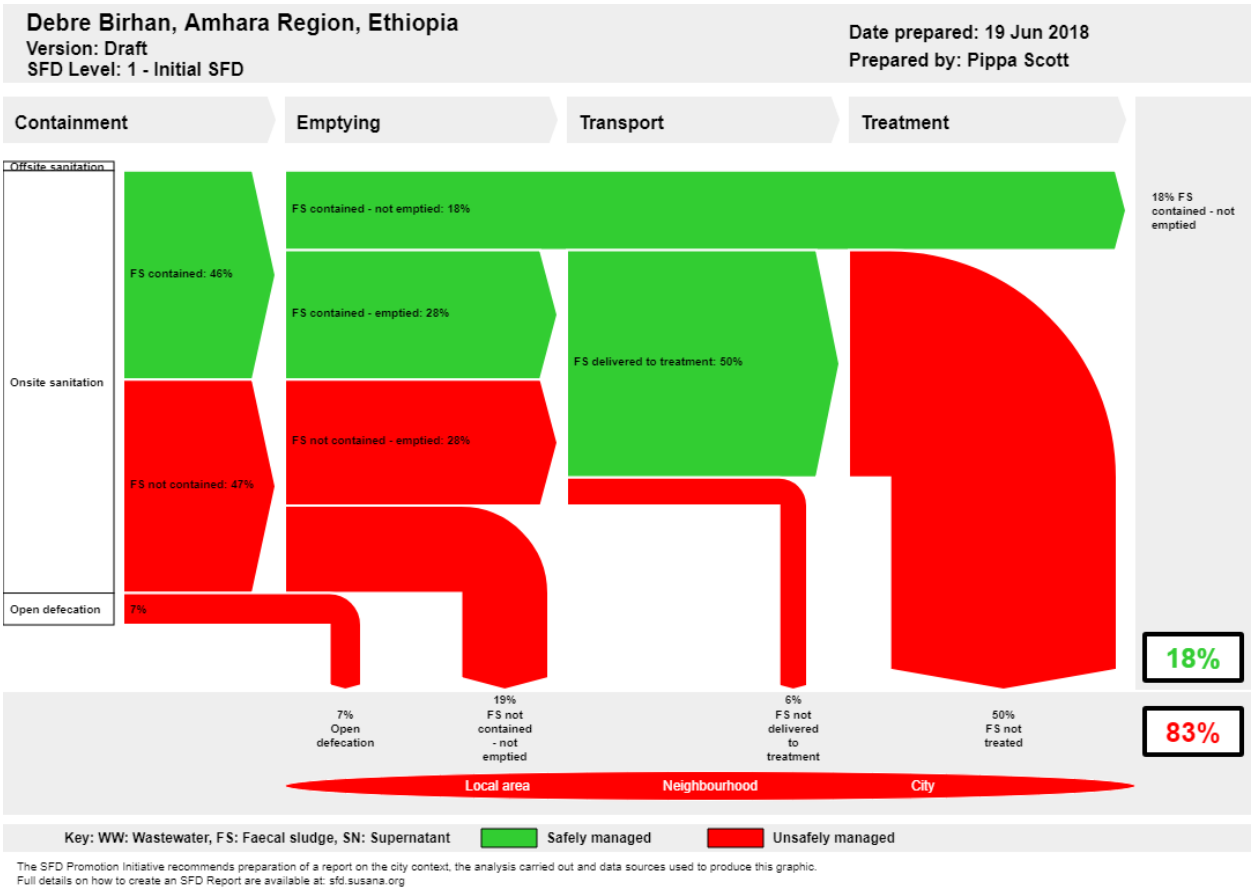


Figure 20. Baseline SFD

Table 11. Estimates and assumptions for endline SFD

Item required to fill SFD	Estimate / assumption	Source
Technology types	The scope of the endline did not aim to capture the range of underground technologies (this is difficult to determine). The SFD is prepared based on the following technology types: • Lined pit or tank with impermeable walls and open bottom, no outlet or overflow (76%). It is assumed all the "containment" tanks are lined, given the levels of mechanical emptying, as unlined pits would likely collapse. • Nearly 10 % (9.5) of on-site containment facilities are damaged or connected to open drain or storm sewer. • Close to 3% (2.8) of septic tanks connected to a soak pit (in the condominium blocks); domestic septic tanks are not.	Endline household surveys (except for the open defecation figure) reported negligible rates in both baseline and endline; however, in the baseline validation workshop the town Health Office advised a rate of 7%. This is the rate that has been used again here.

	• A rate of 7% open defecation.	
Containment types that are failed, damaged, or connected to an open drain	The SFD is prepared on the basis that 10% of all containment types are failed, damaged, or connected to an open drain.	Best estimate. The practice of households connecting their pit to drain, "especially in the rainy season" is widely acknowledged and also cited in the Ministry of Water, Irrigation, and Energy 2019 Situation Assessment Study.[26] It is difficult to determine a reasonable rate for the whole town across a year period accurately. This SFD assumes 10% ,which is considered conservative.
Emptying	Emptying rates: • 64% of condominial tanks • 22% of domestic septic tanks • 18% of pits • 94% mechanized emptying	Endline household surveys.
Contents of on-site containments	One hundred percent of the proportion of contents of each onsite container is fecal waste.	Assumption, standard as per baseline.
Transport	One-quarter of all fecal sludge emptied is delivered to a treatment plant; 75% is illegally dumped.	Estimate based on DBWSSE volumes (working on a basis of the disposal site being open 3 months in the past year). Some private emptiers may take their load to other towns.
Treatment	No treatment.	Key informant interviews. The fecal sludge site is a disposal site, there is no active treatment.
Groundwater pollution	The endline did not assess the risk of groundwater pollution. Note: the Ministry of Water, Irrigation, and Energy 2019 Assessment[27] study notes several risks to groundwater, including percolation from on-site facilities.	The SFD was prepared assuming a 50% risk to groundwater across all technologies. This is a standard assumption also used in baseline.

Public and Communal Toilets

As part of SWS's work in Debre Birhan, an inventory of the status of shared sanitation, including both public toilets and communal latrines, is underway. Endline findings will be reported separately from this report. In the interim, this section includes responses from two communal latrine management key informants (KII.17; KII.19) and two public latrine management key informants (KII.15; KII.16) based in kebeles 02 and 03.

Communal Latrines

Communal latrine users are residents who do not have a toilet on their plot and share a multi-stance block with other households. The two blocks assessed in the endline served 7 and 27 households, respectively.

[26] Ministry of Water, Irrigation, and Energy, Federal Democratic Republic of Ethiopia Situation Assessment Study and Preparation of Urban Wastewater Development Plan (2019).
[27] Ibid.

The seven-household model (KII.19) did not have a management committee. Users were unwilling to pay monthly fees and cleaning was arranged between the users. Emptying charges were split among households but this was noted to sometimes be a challenge for households to pay.

The 27-household model (KII.17) has a management committee that participated in a training around communal latrine management under SWS. It reported difficulties in maintaining cleanliness and a sense of ownership given the high number of users and tanks often becoming full (emptying frequency every 2–3 months). KII.17 expressed a preference for public latrines over the communal model but considered public latrines less affordable: *"I personally prefer to use public latrine. Because user groups do not cooperate to each other to use the latrine properly, in a hygienic manner, willing to pay monthly fee, participate in user meeting and listen management committee. But it is impossible for me and my family to go with my preference from the financial point of view."*

Both KII.17 and KII.19 cite the issues of lack of emptying services by DBWSSE as a key issue, noting that the private emptying companies charge higher rates.

Public Latrines

Public latrine customers are people who do not have their own toilet, such as daily laborers and people who are away from their home for different purposes. Public toilets in Debre Birhan are managed by small and medium enterprises (SMEs) under a Memorandum of Understanding with the municipality. There is no regular communication or support from the kebele administration, and the SMEs pay a flat fee to the municipality of 100 ETB ($2.29) per month in rent and 2,000 ETB ($45.78) per year to internal revenue, representing 3 percent of their annual income.[28] This management arrangement offers no incentive to SMEs to improve their service. Basic upgrading of hardware and structure (roofs, doors, walls) is often required but not provided by the municipality. Additionally, the municipality offers no form of subsidy to SMEs. This situation is unchanged since baseline.

In the endline study, both key informant interviews indicate that open defecation in the immediate environment around the public latrine site is a problem (at night or from customers who are unable or do not want to pay the fee). Both public latrine key informant interviews also reported being unable to provide (KII.15) or having ceased to provide (KII.16) shower services because of the frequency that toilets become full, citing the expense of emptying when DBWSSE is not operating as the limiting factor.

Enabling Environment

The endline found a stronger enabling environment at endline compared to baseline. National policies, regulations, and roles and responsibilities appear more embedded at the town level. Key nodes identified for sanitation at endline are similar to those at baseline. The municipality and DBWSSE, local administration and extension workers, environmental protection and the Sanitation and Hygiene Task Force, and the large private sector actors are important stakeholders, both as pollutants but also potential allies in improving the town.

[28] Based on a model of 150 people per day * 365 days per year * 2 ETB = 109,500 ETB.

The endline findings for the enabling environment were drawn from analysis of key informant interviews (N=21) and a review of relevant literature. The enabling environment analysis of the SCA uses five areas of analysis: policy and strategy, institutional arrangement, budgeting and finance, capacity, and sector planning and monitoring. Each area was scored (using the questions in Annex A) and compared to the baseline. Figure 21 presents the results.

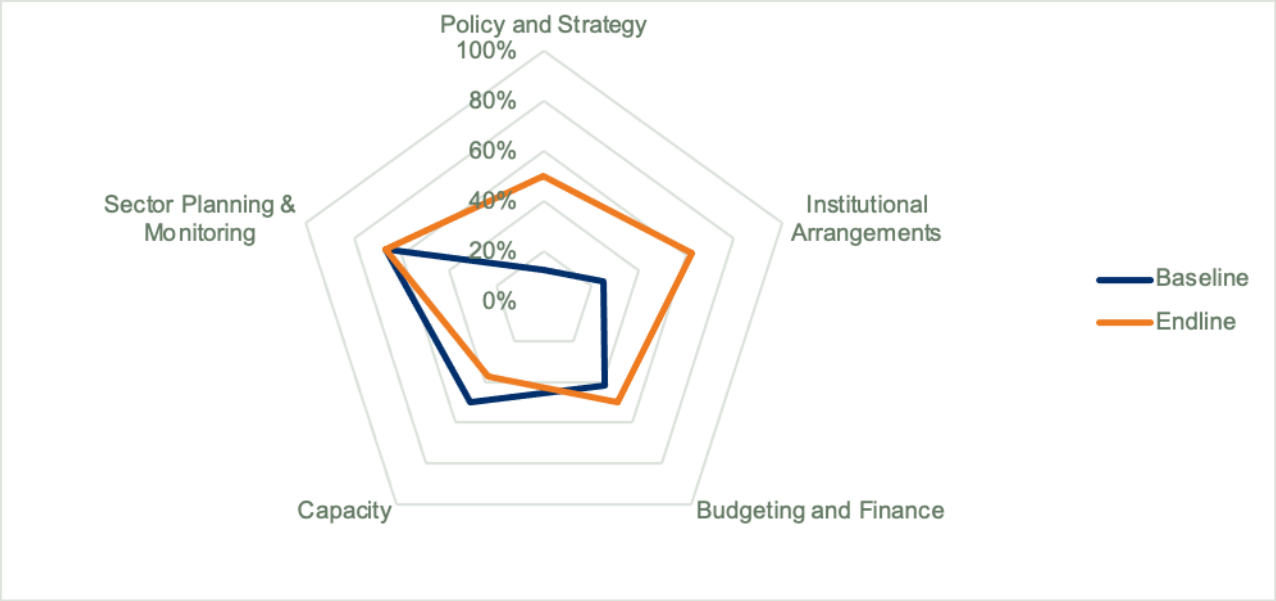


Figure 21. Debre Birhan enabling environment scores for baseline and endline comparison

Synchronous Factors: The UWSSP-II Project

Debre Birhan is one of the secondary cities targeted under the World Bank's UWSSP-II (2017–2023). The development objective of the project is to increase access to enhanced water supply and sanitation services in an operationally efficient manner in Addis Ababa and selected secondary cities. The project has three components: (1) sanitation and water supply services improvements in Addis Ababa, (2) sanitation and water supply services improvement in 22 secondary cities selected from all the regional states and the Dire Dawa city administration, and (3) project management and institutional strengthening.

The UWSSP-II strategic priorities for Debre Birhan are :

- CWIS feasibility study and wastewater management system
- Finance and construction of 10 communal and public latrines, to be handed over to town administration
- New, rehabilitation, or expansion of water supply for low-income community areas
- Operational efficiency of DBWSS
    - Support water utility to install information management system
    - Non-revenue water reduction and business plan

- Institutional capacity building
- Trainings and awareness

Over the course of the SWS project the primary focus of the UWSSP-II was around the first two of these activities (i.e., the construction of shared latrines and the feasibility study). At SWS endline, seven of the 10 intended shared latrines had been constructed and the feasibility study had been completed and was awaiting approval at the municipal level. There is no question that the UWSSP-II will, as the outcomes of the CWIS feasibility study are implemented in the future, improve Debre Birhan city sanitation status.

Policy and Strategy

A significant strategic and policy development for urban sanitation in Ethiopia since 2018 has been the progress of the One WASH National Program (OWNP).[29] During the first phase of OWNP (2013–2018), important strategies were developed, such as the Integrated Urban Sanitation and Hygiene Strategy and Strategic Action Plan (2015), which addresses critical urban sanitation issues, and the Hygiene and Environmental Health Strategy which focuses on the causal impact between WASH and health. OWNP II (2016–2020) focused on strengthening urban wastewater management to safeguard public health and natural resources. OWNP-II articulates an inclusive approach including a strong non-networked sanitation component as the most common sanitation system in Ethiopia, as well as provision for communal and public toilets in lower income and high-density areas. The environmental elements are governed under the environmental policy and environmental and climate change policy enacted into law through the environmental pollution control proclamation, environmental impact assessment proclamation, and industry pollution mitigation proclamation.

These policies were in place at the time of the baseline but not yet operationalized at the town level. Few of the baseline KIIs mentioned OWNP or related national strategies. At endline, these national strategies were mentioned as the go-to reference in place at the national level, which have been operationalized through regional directives and regulations at the Amhara regional government level.

Sanitation is a multi-sectoral issue, with development activities and roles and responsibilities sometimes overlapping. However, endline KIIs suggest greater clarity on roles and responsibilities among actors in the town:

- The Municipal Office is responsible for managing solid waste, public latrines, and the FSD site, as well as constructing facilities with technical support from the town water utility and other stakeholders.

- The town water utility is fully responsible for liquid waste management, providing latrine emptying, transport, treatment, and disposal or reuse.

[29] OWNP is the Government of Ethiopia's plan to improve the provision of safe water and sanitation throughout the country.

- The Health Office is responsible for disease prevention and control and technical support for the communal latrine management body and user groups through sanitation and hygiene promotion.

- Environmental protection is responsible for monitoring and enforcement of environmental protection and sanitation laws and regulations to protect the community from health-related risks and environmental pollution. Environmental protection, in collaboration with town sector offices (health, water utility, municipality, trade and industry, justice, kebele administration, police, etc.) enforces sanitation and environmental protection regulations — such as the illegal dumping of fecal sludge, connecting liquid waste to drains, solid waste disposal on streets, or the brewery using the FSD site for their wastewater. It is also advising the breweries to develop liquid waste treatment plants.

Key informants consider the existing policy, rules, and directives as appropriate for Debre Birhan. The town Hygiene and Sanitation Task Force remains in place, with actors from health, trade and industry, agriculture and environmental protection, the municipality, justice and policy, and culture and tourism. However, several key informants acknowledged their limited effectiveness citing enforcement and implementation of regulation being hampered by a lack of resources (human, financial, and logistics) and a lack of alternative solutions. For example, KII.11 explained that Habesha and Dashen breweries in Debre Birhan were fined ETB 100,000 ($2,500) for environmental violations; however, in the absence of a viable alternative for liquid waste management, environmental and public health protection at the town level is difficult to enforce on an ongoing basis.

Urban wastewater management is articulated as a priority in the OWNP, and several KIIs (7, 8, 10, and 11) drew links between sanitation and the impact on the environment, links with tourism and hospitality, etc. It is, therefore, gaining importance as a strategic interest of the municipality. At the same time, several key informants indicated that prioritization of environmental protection and sanitation development activities by sector offices and kebele administrations remains insufficient (KII.10 and KII.13) and continues to lack adequate resources (human, financial, equipment, and logistics) (KII.11 and KII.18).

In relation to brewery effluent management: Due to the absence of a liquid waste disposal site and solid waste transfer station, and appropriate landfill for solid waste, the enforcement of regulations was not done (KII.II).

Sector Planning and Monitoring

Service targets are articulated in the Municipal Office's strategic and annual plan. The water utility's performance is regularly monitored by the Water Board, led by the Debre Birhan town mayor and the Amhara Regional Water, Mine, and Energy Bureau. Activities that fall outside of the utility's mandate (e.g., public toilet management) do not currently have service targets or monitoring — although this

mandate for public toilet management may shift as part of the World Bank's Urban Local Government Development Project (ULGDP).

The kebele administrations are accountable to the municipality to provide strategic direction to the kebele administration on the management of solid waste, monitoring the performance of public latrines, and engaging the community in sanitation activities at the lower level. Several key informants cited the lack of prioritization of environmental protection and sanitation development activities and lengthy decision-making processes as barriers to change.

Budgeting and Finance

DBWSSE has full control over their infrastructure, planning, and procurement (e.g., for liquid waste and FSM activities). The budget is approved by the Town Water Board, which is chaired by the town mayor. For all municipality sanitation activities, capital investments are planned and managed by the municipality and procured and paid through the town Finance and Economic Development Office; operational costs are planned and managed by respective WASH implementing actors. Services, materials, and equipment are purchased by the town's Finance and Economic Development Office on behalf of WASH sector actors (i.e., local government offices with a mandate or role in WASH service delivery), with the exception of the water utility that has a separate procurement route. Emptying services in the town are intermittent, affecting revenue streams from fecal sludge emptying for cost recovery. In 2 weeks of service provision in March 2021, DBWSSE generated 79,000 ETB[30] ($1,965). In 2019/2020, the municipality allocated ETB 532,225 ($12,182) to construct a solid waste transfer station, a designated landfill for solid waste, and to pay for land compensation. The town water utility paid ETB 27,570 ($631) to construct the FSD site from its own budget. The Debre Birhan Municipal Office is finalizing budget preparations for a permanent landfill site land purchase, construction, and other activities as part of Urban Local Government Development Project, representing an annual sanitation investment of approximately 52 million ETB ($1.46 million) for the town. Staff salaries are drawn from a separate budget.

In addition to public financing, the private sector has provided finance and in-kind donations in the town. For example, the two town breweries contributed ETB 2.8 million ($64,427) to construct a 3 km access road to the 2020 FSD site. One of the breweries is also providing in-kind services worth about ETB 122,324 ($2,800) for a town sanitation campaign, in addition to other contributions to the town (see Box 1).

Box 1: Corporate Social Responsibility Contributions to date in Debre Birhan from Habesha Brewery

Corporate social responsibility activities are mandated by the board of directors for Habesha Brewery and are reviewed on an annual basis. Its current activity profile includes:

- Funds and in-kind support regarding procurement of the FSD site and access road construction.
- Financial and in-kind (purchasing sanitation materials) support for the town Municipal Office to conduct a town sanitation cleaning campaign, regular involvement in an organization town sanitation cleaning campaign.
- Support for the town COVID-19 mitigation task force such as face masks, sanitizer, handwashing kits, and establishing handwashing stations in different parts of the town.

[30] SWS facilitator's diary entry on January 15, 2020 (unpublished).

- Install a big water container for public handwashing in different town locations.
- Provide drinking water access for famers near the factory.
- Construct five communal latrines with handwashing facilities, handed over to the community.
- Create drinking water access for communities near the factory.
- Provide electricity connections for 70 farmer households living near the factory.
- Construct and equip a health post and provide medical equipment for Tebasse Health Center.
- Support street children and elders by providing mattresses, blankets, and sanitation materials.

Capacity for Urban Sanitation Service Delivery

The role, scope, and mandate of sanitation improvements have increased for small towns through policy changes and population growth; however, this has not yet been matched with increased capacity. At endline, DBWSSE had six staff dedicated to sanitation (one liquid waste disposal core process owner, one officer, and four vacuum truck staff). KII responses suggest inadequate resource allocation (human, technical, material, and logistics) presents a challenge at the town level to implement, monitor, and enforce the various sanitation activities. However, a newly approved utility structure will dedicate about 15 sanitation staff, including roles to provide emptying services for town households, communal and public latrines, public organizations and business institutions, and monitoring wastewater management, which, once in place, will significantly strengthen capacity.

Effective environmental regulation relies on the regulator (i.e., the environmental agency) for monitoring and enforcement and the polluter to be aware of and comply with limits. In the case of Debre Birhan and breweries using the FSD site, the regulator has imposed a fine and is encouraging the brewery to construct its own wastewater treatment plant, but attracting private investment to the town, polluters also being employers in the town, and limited capacity to monitor and enforce regulations present competing dynamics. The breweries, as polluters, although aware of the limitations, are opting to dispose of their effluent away from direct discharge to water bodies, which is not ideal but potentially has less environmental impact than direct discharge to rivers. At baseline, regulators' ability to exercise environmental protection was very weak; the core process was located under the Environmental Protection Land Administration and Use Agency, which had, in practice, a limited mandate to enforce environmental protection laws. At endline, there seems to be a shift where the environmental protection officer (still under the Environmental Protection Land Administration and Use Agency) has an expanded mandate to enforce environmental protection laws with support from the town Hygiene Committee, with an apparent greater appreciation of environmental protection. The effectiveness of environmental regulation can be viewed as conditioned by the action of at least two main agents: the regulated firms and the public agency (the regulator). The agency's role is two-fold: to enact environmental regulations and to monitor firms' environmental behavior and enforce environmental regulations. The regulated firms, on the other hand, must be informed about the legal limits imposed on them and subsequently they must be able to comply with those limits.

Interfaces and Relationships

The Kebele and Sub-Kebele. At baseline, kebele administration was identified as the primary conduit between residents and town decision-makers, through formal and regular meetings with annual plans. The UHEWs, municipal kebele-level sanitation workers, and enforcement officers were identified as the

primary conduit for encouraging and monitoring good household sanitation practices through their public health package. This remains true at endline with these kebele and sub-kebele based structures, both formal and informal, acting as critical interfaces. They are closest to the population with good knowledge of their realities. The new town municipal office structure brings additional sanitation officers for kebele administration. In each kebele, one sanitation officer is assigned to work on solid waste and public latrine management.

The Municipality and Public Administration Offices. At baseline, the Integrated Urban Sanitation and Hygiene Strategy and WASH Implementation Framework were not cited with respect to frameworks that govern town sanitation. At endline, the strategy is well known and the roles of the municipality and DBWSSE are clear and operationalized.

DBWSSE. At baseline, DBWSSE was responsible for emptying, transport, and treatment of fecal waste; the municipality formerly took care of these tasks. DBWSSE was identified as a key interface for FSM and for all emptiers as the holder of service contracts with private enterprises to conduct emptying on their behalf, with customers (via a monthly customer forum) and the municipality (via legal contract), and regular performance meetings with town sanitation offices. At endline, the relationship with the municipality had improved, as demonstrated by a close working relationship and coordination around the FSD site issue compared to baseline. DBWSSE has a strong customer forum that reaches community representatives for water but not for sanitation; the nature of their customer relationship for sanitation is defined by providing emptying services on request. As such, the suspension of the emptying service by DBWSSE effectively suspended their relationship with households. This is similar to the relationship between DBWSSE and the private emptiers, in the absence of providing services, the interface between these two agents weakens.

Exercising Environmental Protection. At baseline, the environmental protection officer at the Urban Agriculture and Land Administration Office had limited scope to exercise environmental protection. This task fell to the town Hygiene Committee, comprising the Police Department, Justice Office, Trade and Industry Office, Culture and Tourism Office, and Health Office, although enforcement was limited. At endline, while formal governance structures do not appear to have changed, there is a clear shift in mandate and appetite to enforce environmental protection and exercise powers. At endline, the environmental protection officer was working collaboratively with the town Hygiene Committee, was actively involved in assessing environmental impact of new developments, and had issued fines (e.g., to the brewery) for non-compliance. While there are significant resource challenges around these powers being exercised to the full extent of the law, this increased focus on environmental protection is a welcome change.

Private Actors in Debre Birhan. At baseline, hotels and industries were identified as key polluters but also key employers and economic drivers in the town. At endline, the issue of wastewater discharge to drains from hotels and the lack of a solution for brewery effluent management remain significant, as cited by several key informants. These are clear barriers to improving town sanitation. However, the endline findings suggest that corporate social responsibility and environmental pollution commitments and strategies from the private sector (like the breweries) could bring about change.

Learning Alliance Impact

The learning alliance was found to have helped town stakeholders to achieve a shared vision or common agenda for sanitation in the town, work at the scale of the town, improve collaboration and joint planning and decision-making. The learning alliance did not address the root causes of sanitation issues or remove barriers to sanitation progress in the town.

Ten key informants, who were members of the learning alliance, were invited to respond to a questionnaire on how the learning alliance affected action research (see Table 11) and the outcomes of those processes (see Table 12). Each question was asked on a Likert scale ranging from *strongly disagree* to *strongly agree*. The color coding (green-yellow-orange-red) of Tables 11 and 12 indicates how high questions are scored. It is important to note that there may be some responder bias, therefore, the team is most interested to see which questions elicited strong agreement or not.

Table 12. Evaluation of learning alliance processes

On a scale of 1-5 (from strongly disagree to agree strongly), to what extent do you agree with the following statements on how the learning alliances affected the action research processes described?	
The learning alliance helped stakeholders to achieve a shared vision or common agenda for sanitation in the town.	4.6
The learning alliance helped stakeholders to achieve a common understanding of the sanitation problems of the town.	4.7
The learning alliance helped stakeholders to plan sanitation interventions.	4.4
The learning alliance helped stakeholders to initiate mutually reinforcing activities to improve sanitation.	4.4
The learning alliance helped to achieve regular communication between sanitation stakeholders.	4.3
The learning alliance helped stakeholders to test sanitation solutions.	3.7
The learning alliance helped stakeholders to share and reflect on sanitation issues.	4.4
The learning alliance helped stakeholders to achieve working at the scale of the town rather than the project or targeted interventions for sanitation.	4.1
The learning alliance helped stakeholders to tackle the root cause of sanitation issues.	3.7

Overall, respondents (N=10) agreed most strongly with statements that the learning alliance helped stakeholders achieve a shared vision, common agenda, and understanding of the town's sanitation problems. Respondents agreed the less strongly (neutral) with statements that the learning alliance

helped stakeholders test sanitation solutions and tackle the root cause of sanitation issues. However, there were some differences in responses between different stakeholders; service providers and town-level decision-makers scored more positively on communication levels with the local authority and the private sector, suggesting an opportunity to bring in these actors more centrally to the learning alliance process. Table 13. Evaluation of learning alliance outcomes

On a scale of 1–5 (from strongly disagree to agree strongly) to what extent do you agree with the following statements on learning alliances outcomes?	
The learning alliance improved the capacity of stakeholders with respect to sanitation planning and implementation.	4.4
The learning alliance strengthened the sanitation sector.	4.2
The learning alliance removed barriers to sanitation progress in the town.	3.9
The learning alliance provided decision support.	4.4
The learning alliance improved collaboration.	4.6
The learning alliance supported joint planning and decision-making.	4.6
The learning alliance improved transparency.	4.2
The learning alliance improved accountability.	4.3

Respondents agreed most strongly with statements that the learning alliance improved collaboration, joint planning, and decision-making. Respondents agreed least strongly (although still in agreement) with the statement that the learning alliance removed barriers to sanitation progress in the town.

Organizational Network Analysis

As in the baseline, the endline ONA examined three relationship types — information sharing, problem solving, and coordination — among the participating organizations. The ONA simulation produced several graphics depicting the nature of the relationships, strength of interactions among actors, and quantitative metrics commonly used in the discipline of systems mapping (e.g., density, reciprocity, degree). The result is a fully interactive, publicly accessible, user-friendly tool that can be used by SWS and other stakeholders.[31] Interactive maps can be accessed at Debre Birhan. A separate report on the ONA is available on Globalwaters.org.

The connections among learning alliance members increased in all three types of relationships and successively. Information-sharing relationships are the most common (Figure 22), followed by direct coordination (Figure 23), and then problem-solving (Figure 24). Cooperation between members extends outside the immediate alliance and continues with former members and stakeholders surveyed in the

[31] Interactive maps can be accessed on Kumu at: https://kumu.io/lincllc/sws-debre-birhan-endline (Accessed October 11, 2021).

baseline and/or midterm. The average number of connections of each actor (average degree) also increased for all three types of relationships.

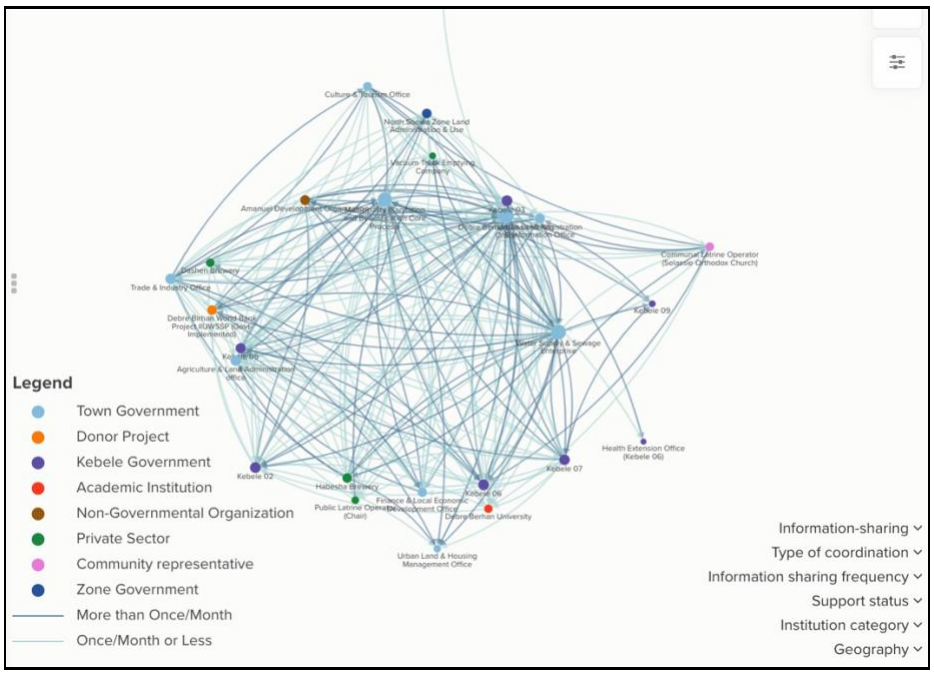


Figure 22. Information sharing among members of the Debre Birhan Learning Alliance

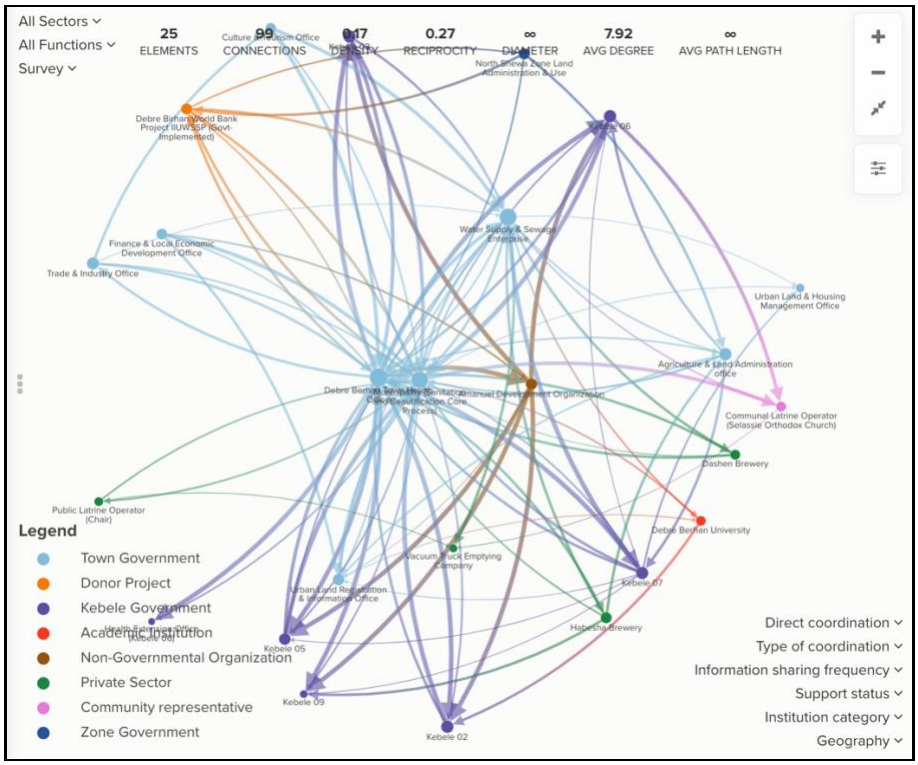


Figure 23. Direct coordination among members of the Debre Birhan Learning Alliance

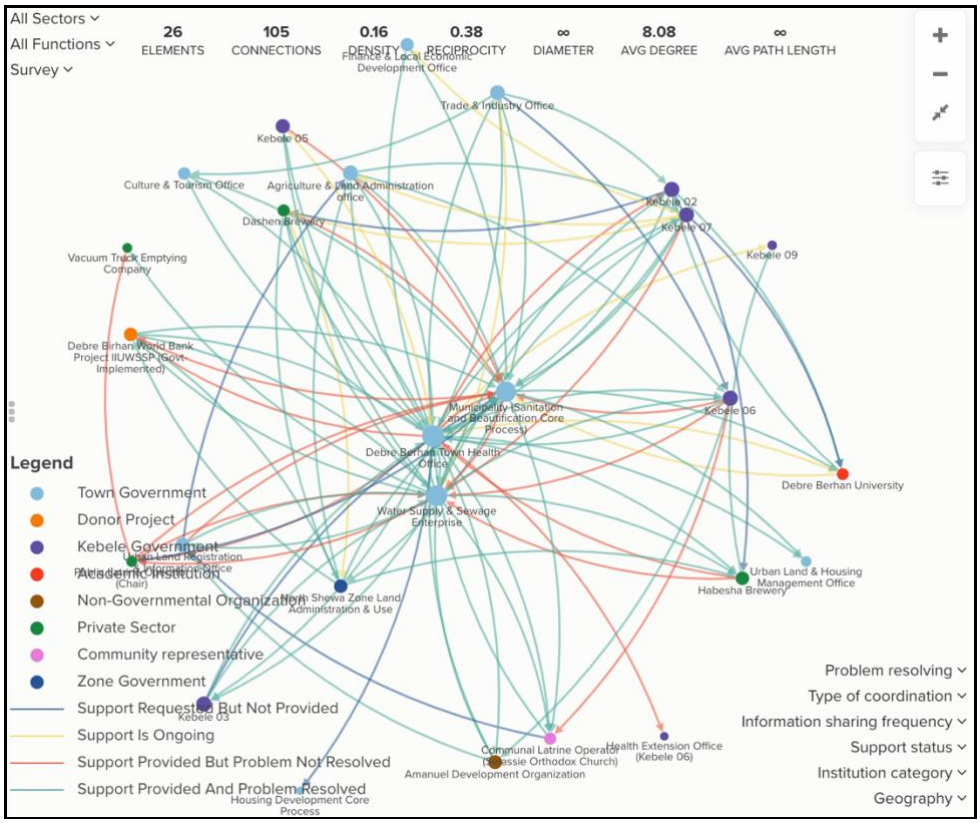


Figure 24. Problem-solving among members of the Debre Birhan Learning Alliance

Conclusions and Recommendations

This section of the report considers what changed, and what did not change, since baseline and over the course of SWS. The results of the endline were presented and discussed at the final SWS–funded learning alliance meeting on July 12, 2021. The members discussed and accepted the results with little dispute. They recognized the value of the collective and made arrangements to continue its activities after the end of SWS. Following this, decision-makers in Debre Birhan identified and assigned leads and responsibilities among the three main actors in WASH — the water utility and Health Office will act as the chair and deputy chair, respectively, going forward, and the municipality will serve as the secretary. They also allocated the first year of funding for the learning alliance's activities from the municipal budget. The learning alliance conducted its first meeting without the support of SWSon October 2021.

The aim of SWS was to strengthen the local systems responsible for sanitation services to operate more effectively and efficiently. This was done through establishing the learning alliance forum of sanitation stakeholders. This study is not able to attribute definitive causal impact. Tables 14 and 15 highlight the learning alliances' role in each of the changes the endline highlighted.

What Changed

- **Sanitation stakeholders advanced a common agenda**. SWS and the learning alliance process helped stakeholders achieve a shared vision or common agenda for sanitation in the town, work at the scale of the town rather than the project or targeted interventions for sanitation, improve collaboration, and support joint planning and decision-making.

- **Primary emptying service provision moved from the DBWSSE to private companies.** At endline, the most common emptying method was the use of vacuum trucks with private companies being more commonly used service providers (52 percent of all emptied pits). This is a significant change from the baseline where 72 percent of respondents reported using DBWSSE for this service.

- **Emptying costs increased.** The endline found an increase on DBWSSE emptying fees from $14.60 at baseline to $20, representing a 36 percent increase. Private sector rates increased from $22–$25 to a price range of $36-$99, representing an increase of at least 63 percent and up to 296 percent at the top end of prices paid. While this study is limited in drawing causality between different factors, increased fees for emptying is a logical outcome of the DBWSSE not offering this service. There is no benchmark for services and in some cases private firms must travel long distances, thus incurring greater expenses, which are transferred to households. Unresolved issues around closing the FSD site may have a negative financial effect on Debre Birhan residents, as well as an environmental impact through illegal dumping. This increased cost has directly impacted public and communal latrine users, too, with the two public latrine key informants citing the increased cost of emptying as the reason they cannot offer shower services to the public because pits fill too quickly.

- **Sanitation risk shifted from the city level to a localized area**. Comparison of baseline and endline SFDs indicates a shift of sanitation risk from the lack of fecal sludge treatment to fecal waste not reaching a dedicated site and potentially being discharged locally, risking environmental and public health. Open defecation, illegal connections, and dumping fecal waste into rivers and farmland are acknowledged at endline. There is limited enforcement of any of these practices.

- **There is stronger environmental protection enforcement and awareness.** At baseline, enforcement of environmental protection laws was very low. At endline, while there are still some challenges of resource and capacity, the study notes a shift toward a stronger exercising of environmental protection regulations within the context of wider environmental awareness. This is evidenced, for example, by the 100,000 ETB ($2,500) fine leveraged against the town's breweries for environmental violations.

- **There have been annual increases in sanitation funding at municipal level.** After years of prioritizing water over sanitation in Debre Birhan, the town administration increased its allocations for sanitation by 27 percent in 2020, and by 56 percent in 2021.

- **There is a stronger enabling environment.** Overall, the enabling environment for sanitation has strengthened since baseline. This is most notable in the areas of operationalizing national policy, strategy, and regulatory frameworks at the town level, as well as greater clarity

around the institutional arrangements, roles and responsibilities, and coordination. At the time of endline data collection, there was a capacity shortage (e.g., only 7 of the 15 technical positions were filled, despite increased mandate for the utility). However, a proposed new structure and DBWSSE staffing as part of UWSSP-II may address this. SWS coincided with the roll-out of UWSSP-II, and in the context of the National Integrated Urban Sanitation and Hygiene Strategy and Strategic Action Plan. The objective of both of these urban sanitation delivery initiatives are synchronous with SWS in strengthening the enabling environment. It is, therefore, difficult to disentangle the SWS efforts in isolation from the wider strategic direction. That said, in practice, UWSSP-II was not being implemented during the SWS project. The learning alliance contributed to construction of the temporary FSD site, public engagement, capacity building, and the learning alliance platform itself. It is, therefore, reasonable to suggest that SWS played a key role in initiating and strengthening a forum of sanitation stakeholders in the town. Learning alliance key informant responses suggest the learning alliance played a role around achieving a shared vision, common problem understanding, improving collaboration, and supporting joint planning and decision-making.

Table 14. System changes observed

Change Observed	Factors Affecting this Outcome, SWS Activities, and Evidence of Contribution	Related SWS Activities
Common agenda between sanitation stakeholders in town	The One WASH National Program Phase 2 sets a common agenda for sanitation at a national level, and at endline it had been operationalized at regional level through directives and regulations.	Developing a common agenda specifically for Debre Birhan around sanitation was an integral part of the SWS action learning agenda. SWS supported visioning and action planning exercises with the learning alliances.
Private sector dominating the emptying market at endline	This observed outcome is primarily because DBWSSE ceased providing FSM services when the FSD site was closed. It closed due to reaching capacity and complaints of local community.	Finding a new FSD was a focal area of the learning alliance throughout SWS. The learning alliance and SWS engagement did not prevent the FSD closing, nor did it solve the root problem of the breweries and the municipality using the same site, however, many of the learning alliance activities were focused on identifying and brokering the co-financing of the new FSM site. The learning alliance provided a forum for the breweries, mayor, and DBWSSE to discuss, negotiate roles and responsibilities, and collaborate to solve a problem together around this issue.
Emptying costs increased	This outcome is primarily because DBWSSE ceased providing FSM services (with capped prices) when the FSD site was closed. The private sector emptiers could charge higher prices.	The learning alliance efforts focused predominantly on opening the FSM site as a means of controlling this outcome rather than the outcome itself.
Sanitation risk shifted from the city level to a localized area	This outcome is primarily because the FSD site was closed so FS was disposed locally either via opening pits to drain or private sector disposal of FS into the local environment.	The learning alliance efforts focused predominantly on opening the FSM site as a means of controlling this outcome rather than the outcome itself.
There have been annual increase in sanitation funding at municipal level	This outcome is primarily a result of the learning alliance's advocacy efforts. In the first year of its establishment, the members recognized that theirs was a membership comprised of primarily technical experts with little decision-making authority and subsequently set up a regular meeting that facilitated interaction with key town decision-makers.	The learning alliance held regular targeted meetings with key town decision-makers. They used these meetings to raise awareness of the alliance's work and discussed areas that required addressing.
There is stronger environmental protection enforcement and awareness	The underlying factors behind this change are multiple. While the formal structures do not appear to have changed, there is a clear shift in mandate and appetite to enforce environmental protection and exercise powers. At endline, the environmental protection officer was working collaboratively with the town hygiene committee, was actively involved in assessing environmental impact of new developments, and had issued fines (e.g., to the brewery for lack of wastewater management) for non-compliance.	Heightened awareness of the issues of brewery effluent management in the town, which was a core part of the FSM site discussions at the learning alliance meeting.

There is a stronger enabling environment.	The underlying factors behind this change are multiple.	The learning alliance provided a forum to operationalize and troubleshoot sanitation issues at the very local level within a wider OWNP regional and national agenda. These connections and clarity of roles and responsibilities are foundational to local system strengthening.

In summary, the 3 years since the baseline has seen some small but noteworthy positive changes in Debre Birhan's sanitation service delivery system, the most obvious being in the enabling environment. The National Integrated Urban Sanitation and Hygiene Strategy and Strategic Action Plan is operationalized at town level, roles and responsibilities are clearer, environmental protection — although still lacking enforcement capacity — has a clearer mandate and powers are being exercised more, and budget and planning is in place for better FSM and utility capacity in the town. Learning alliance member key informants (N=10) agreed that the learning alliance helped stakeholders to achieve a shared vision, common agenda, and understanding of the town's sanitation problems, as well as improved collaboration, joint planning, and decision-making. That said, some developments since baseline have negatively affected residents, notably the increased cost of emptying services due to the suspension of services provided by DBWSSE

It is feasible to suggest that the learning alliance focus on brewery effluent management in the town, providing a forum to operationalize and troubleshoot sanitation issues at the town level within a wider OWNP regional and national agenda, and better clarification of roles and responsibilities are foundational to strengthening the system of service delivery. The learning alliance efforts focused predominantly on opening the FSM site and did not address the negative outcomes of the increased rates of emptying and FS being dumped into the local environment.

What Has Not Changed

- **Sanitation is not the top priority for residents.** The endline found that sanitation is not perceived as a development priority for residents of Debre Birhan, the same as at baseline. Overall, many residents are satisfied with their current sanitation situation and consider other issues, such as roads and gray water management, to be more pressing. This does not mean that sanitation is not a development priority in terms of improving public health, rather it is not expressed as an explicit demand by households.

- **Town actors are not tackling the root causes of sanitation problems.** At endline, the learning alliance was not found to help stakeholders tackle the root causes of sanitation issues or remove barriers to sanitation progress in the town. The unresolved issue of breweries using the same site to dispose of their liquid waste and fecal waste is impacting both financial and WASH service outcomes for residents in the town. This is unlikely to be resolved until it is addressed in a permanent and sustainable manner.

Table 15. System no-changes observed

What Has Not Changed	Factors Affecting This Outcome, SWS Activities in This Area, and Evidence of Contribution	Related SWS Activities
Sanitation is not the top priority for residents	Other issues, such as roads and gray water management are more pressing for residents than sanitation.	The learning alliance sought to increase awareness of the issues of sanitation in the town.
Town actors are not tackling the root causes of sanitation problems	Causes of sanitation issues or removal of barriers to sanitation progress in the town: the unresolved issue of breweries using the same site to dispose of their liquid waste and fecal waste is impacting both financial and WASH service outcomes for residents in the town. This is unlikely to be resolved until it is addressed in a permanent and sustainable manner.	The learning alliance efforts focused predominantly on opening the FSM site as a means of controlling this outcome. The town, however, had multiple wastewater effluent issues that were combined into one solution.

Many of the challenges that were identified at baseline remain. Both the service delivery environment and the living environment are slightly weaker than they were at baseline, meaning changes happening at the town level have yet to benefit residents.

The lack of on-site treatment of brewery waste is a significant contributing factor to the closure of the temporary wastewater disposal site. The learning alliance efforts focused predominantly on opening the wastewater disposal site and although the complexity of the challenges around commercial and industrial wastewater are acknowledged by learning alliance members, the actions defaulted to the known solution of a shared site to dispose of both FS and brewery effluent together. This situation is unlikely to be resolved until waste management for both FSM and industrial and commercial effluent are addressed in a permanent and sustainable manner.

Limitations

This study is designed to identify changes in a set of indicators that describe three different sub-parts of the urban sanitation system and their interfaces, namely the living environment, the service delivery environment, and the enabling environment. As with all urban human-technology-environment systems, there are multiple underlying factors contributing to change in the system. This study is, therefore, not able to attribute definitive causal impact to any one intervention; rather it can observe the changes at an aggregate level and infer a likely contribution based on the evidence available. This carries an inherent bias risk of interpretation, therefore, the results are reported in terms of SWS activities in this area with relevant evidence rather than definitive contribution.

Recommendations

The recommendations of this report can be grouped into two areas: The first set of recommendations are around improving accountability and ownership of specific issues that have been identified and would benefit from greater clarity on roles, responsibilities, and better accountability. The second set of recommendations are related to complex problems that the town faces that will require multi-stakeholder cooperation to resolve. These recommendations are around these problem areas, identifying levers and establishing mechanisms to tackle the root causes of some of the complex issues collectively. Moreover, these recommendations are targeted at the learning alliance as it is strategically placed to build on its progress to date and further these recommendations as a collective and through its members' roles and functions in their respective organizations.

Accountability and Ownership

1. **For the learning alliance to continue, members will need to agree upon and designate responsibility to one party to maintain the learning alliance forum.** SWS provided accountability and momentum for the learning alliance through regular communication and follow-up visits to Debre Birhan. However, a 5-year timeframe is short in terms of changing mindsets and bringing about change. There is a risk that, without SWS support, the momentum of regular meetings and capturing lessons from the learning alliance will stall. The learning alliance has expressed intention to continue to meet after SWS project closure. For this to happen, learning alliance members should consider how the forum can be maintained without SWS project support and designate responsibility to a named stakeholder with a vested interest in maintaining the forum. Additionally, the learning alliance should consider widening the membership to involve the environmental protection team leader, members of the town Sanitation and Hygiene Committee, and those closest to the problem (e.g., kebele and sub-kebele representatives and the private sector, particularly the largest polluters).

2. **The Mayor and Municipal Office should strengthen town decision-making and joint planning across urban development streams through dedicated task forces by ensuring institutional mandates for managing non-sewered sanitation are clear and adequately structured, financed, and staffed.** Coordination and the speed of decision-making remains a challenge and mechanisms for stronger joint planning across urban development streams (particularly waste management) can be strengthened. These task forces should be time-bound and outcome-focused groups tackling specific priority and/or complex issues whose members have a vested interest in achieving the outcome. Task forces should pay attention to unintended or negative outcomes that may arise, and continually assess what works and does not work and adapt accordingly.

3. **DBWSSE should assume accountability for FSM services.** DBWSSE is the FSM service provider, regardless of whether the FSD site is operational or not. There are actions DBWSSE can and should do in their role as the accountable authority:
    a. Establish a structure for emptying fees so that they remain fixed and affordable for households and businesses in the absence of DBWSSE providing a service. This will prevent inflation of private sector prices above market level.
    b. Maintain a customer forum or communication channels for residents to seek advice, support, or submit complaints regarding sanitation (not just water), and maintain awareness of the situation.
    c. Continue to provide emptying services in Debre Birhan if there are options to use disposal sites further afield.
    d. Seek to prevent indiscriminate disposal of waste into rivers and wasteland with a view to mitigating public health and environmental risk as much as possible.

4. **DBWSSE should improve public latrine management.** Public toilet management in Debre Birhan, as in many towns in Ethiopia, is currently managed under a basic service contract where the

management of the toilet is delegated to another party with a fixed fee. This contracting model does not incentivize SMEs to improve their service or hold the municipality accountable for necessary repairs. Other contracting models exist[32] that better incentivize the operator to improve service quality and where responsibilities for repairs are clearly articulated. National Public Toilets Management Guidelines have been drafted in 2021 by the Ethiopian Water Development Commission, under the auspices of UWSSP-II. These are intended to support selecting and implementing appropriate public toilet management models for improved service. It is recommended that the town administration, DBWSSE, and the learning alliance engage with these guidelines and consider alternative management models for public toilets to improve public toilet service delivery.

5. **DBWSSE should establish a town-level sanitation services monitoring framework**. Develop and monitor appropriate key performance indicators for sanitation service delivery for FSM services, private sector emptiers, public toilets, and the municipality. These should be realistic targets to encourage progressive service system improvements. In the first instance these should focus on a small set of service-level indicators (or service charter) specific to safely managed sanitation. For example: service outcomes (i.e., the proportion of safely managed sanitation, customer satisfaction), core utility performance indicators (including capacity and staffing), and financial performance indicators. In time this monitoring framework can be expanded to establish systems for monitoring and evaluating achievement of service standards and then work toward strengthening monitoring and evaluating systems against service standards. There are several sets of indicators that are relevant including the International Benchmarking Network for Water and Sanitation Utilities,[33] Citywide Service Delivery Framework,[34] and Citywide Inclusive Sanitation indicators set.[35]

Multi-stakeholder Cooperation to Tackle Root Causes

The following are complex problems that SWS identified that will require multi-stakeholder and concerted effort to resolve. These are focused on the challenges of waste management and require collective countermeasures to tackle illegal fecal waste disposal as a root cause of several issues.

The endline assessment found that while the learning alliance made progress with regard to communication, collaboration, and joint decision-making, some of the root causes of pollution and waste in the town persist (notably the shared disposal site for fecal sludge and brewery effluent and hotels discharging fecal sludge to drain). These issues impact both environmental and public health, and it is likely there is some overlap in roles and responsibilities. Addressing these issues sustainably will require building on the foundation of collective understanding of the problem; close collaboration between the environment, health, and enforcement teams; and supporting agencies built through the learning alliance to tackle root causes for households, hotels, other commercial sites, and industry.

---

[32] For example delegated management contract, a lease contract, concession contract models. See Toubkiss, J. CMS guide n°5: How to Manage Public Toilets and Showers (pseau.org)
[33] IBNET English | The International Benchmarking Network (ib-net.org)
[34] Inclusive Sanitation in Practice (incsanprac.com)
[35] Full+List+of+CWIS+Indicators_July2021_v2.pdf

6. **To address persistent issues of pollution and waste, promote a town-wide "Cleaner Debre Birhan" campaign.**

    - **For households:** Given household development priorities in Debre Birhan, it is unlikely that any intervention framed as "toilet only" would gain strong momentum. At the household level, interventions should take into account wider development issues like gray water management or even wider urban development (roads, stormwater management, street lighting) to heighten investment in the community. If sanitation changes and investments were framed as "Cleaner Debre Birhan" or "Healthy Homes," they may be more consistent with residents' priorities.
    - **For the private sector:** Leverage corporate social responsibility. Habesha Brewery is demonstrating a strong corporate social responsibility culture that could be leveraged by the town Health Office for continued and greater focus on the WASH sector (e.g., by supporting Handwashing Day or World Toilet Day).

The issue of commercial and industrial waste management affecting fecal waste management will likely not be resolved until there is a comprehensive plan and technical solution for all waste streams in place. To deliver this, SWS recommends two focus areas that could be tackled by a dedicated task force:

7. **Create and strengthen incentives for better waste management in the town.**
    - There is a need for stronger enforcement of environmental regulation on polluters. Specifically, the volumes of wastewater coming from the breweries are substantial and hamper the safe management of wastewater and fecal sludge.
    - Penalize commercial actors for breaching environmental regulations. With a renewed prioritization on sanitation by the learning alliance and stronger enforcement capability, the commercial players like the hotels should be incentivized to stop discharging their fecal waste directly to drains. To quickly restore the environment, sums generated through these fines should be directed to on-the-ground improvements of environmental and public health.
    - Mobilize public support for the private sector to better manage their waste. The town and regional departments of trade and industry and environmental protection — potentially leveraged through the municipality, learning alliance, DBWSSE, or other players — could initiate a dialogue with the aim of the breweries actively pursuing financing and modernization of brewery sites in the town to have their own treatment plant (and achieve ISO 14001 compliance, following the example of Dashen Brewery [Gondar Branch] as the first ISO 14001 certified brewery in Ethiopia).

8. **Identify and develop shared solutions across different waste management challenges in the town and align efforts, learning, resources, where feasible.**
    - **Pricing:** The issue of inflated prices for waste management service provided by the private sector also applies to solid waste operators. There is an opportunity for the municipal sanitation office to work with both fecal waste vacuum tankers, via DBWSSE, and solid waste private operators to establish respective fee structures as part of a comprehensive town sanitation strategy.

- **Revenue:** Generate revenue for waste management services with support of the town utility. It is understood that there is a plan to implement a solid waste fee collection in Debre Birhan this year.[36]
- **Land:** Secure land for an additional temporary waste disposal and treatment site until the permanent fecal sludge treatment site is finalized by UWSSP-II.

[36] In Finote Selam, located in the Amhara Region of Ethiopia, a flat rate of 20 ETB ($0.50) was applied to all town residents for solid waste management collection and office space was provided by the town water utility. When residents came to pay their water bill they could also pay for solid waste or add a solid waste fee to their water bill. This led to increased revenue streams for waste management in the town (to buy vehicles for waste collection); collection coverage achieved 96 percent of the town every 2 days, bringing major improvements in environmental health and satisfaction of the town's residents. Source: Tillett, Will. "Systems Strengthening for Sustainable Urban WASH Services: Big Gains from Small Funds," WaterAid .(2017). Available at: https://washmatters.wateraid.org/sites/g/files/jkxoof256/files/wateraid-ethiopias-20-town-capacity-development-programme-case-study.pdf (Accessed June 16, 2021).

Annex A: Indicators Measured in the Endline

Table 16. The living environment

Indicator	Sub-Indicator	Data Sources	Method	Research Question	Output
1.1 Demand for basic services	Top five development priorities (water, sanitation, land, roads, security, employment)	Residents	HHS, KII	Rank 1–5 (1 most important)	Ranking
	Perspective of residents of prioritization of sanitation and meeting their needs	Residents	HHS, KII	Do you think the urban local government takes your needs and concerns into account?	
	Satisfaction of sanitation	HH	HHS	How satisfied are you with the toilet you normally use? Why?	Scale
		HH	HHS	How satisfied are you with the emptying service you normally use? Why	Percent of satisfied
1.2 Tenure	Settlement tenure type and mix	HH	HHS	Is this house owned, rented, or rent free?	Tenure mix
				If rented, does the owner live in the same building/plot?	Yes/no
				If homeowner, do you own the land?	Legal title; customary or other title; no
				Do you currently fear eviction?	Yes/no
	Duration of stay	HH	HHS	Number of years of residence in current housing unit	Years
				Number of years in settlement	Years
1.3 Housing Unit	Permanent walls	HH	HHS (observation)	Permanent walls	Yes/no
	Permanent floors (inside)	HH		Permanent floors (inside)	Yes/no
	Assessment of building quality	HH		Assessment of building quality	Good, average,

					dilapidated
1.4 Infrastructure and Services	Electricity to plot	HH	HHS (ask or observation)	Is there electricity to the plot?	
	Piped water to plot			Water access	
	Access to toilet			Sanitation access	
	Drain outside plot			Is there a gray water drain running outside the plot?	
	Paved road			Is there a paved road outside the plot	
	Streetlights outside plot			Are there streetlights on the road/path outside the plot?	
	Garbage disposal system			Does the HH use a garbage disposal collection service or system?	
1.5 Neighborhood	Type of neighborhood	Learning alliance	Site visit	What is the typology of settlement	Categorization
	Cleanliness	HH	HHS	Do you consider your neighborhood to be clean?	Yes/no
	Location and transport	HH	HHS	Do you consider your neighborhood a good location in the city (in terms of transport links; employment)?	Yes/no
	Safety	HH	HHS	Do you consider your neighborhood safe?	Yes/no
	Crime	HH	HHS	Have you been a victim of crime in the past year?	Yes/no
	Cost per m^2	Learning alliance or HH	KII	Do you know the cost of a m^2 of land in this neighborhood?	Yes/no

Table 17. The service delivery environment

Indicator	Sub-Indicator	Data Source	Method	Research Question	Output
2.1 Containment	Sanitation access	HH and literature	HHS	Which toilet do you usually use? (i.e., on-site, offsite, shared, flying toilet)	Description and percent of population using this type
	Sanitation technology	HH and iterature	HHS	If on-site, what type of toilet or latrine do you have? (unimproved, improved, pour-flush, septic tank)	Description and percent of population using this type
	Number of operational public toilet and communal toilets (including clear maintenance plans)	Public toilet operator	Site survey	How many of the communal toilets are operational? How many have a clear maintenance plan?	
2.2 Emptying	Diversification of customer base for FSM services	Service provider – utility (SPU), Service provider – private (SPP)	Site visit	Percent of customers using the pit emptying services that are domestic	Percent
	Inventory of emptying service providers (manual and mechanical)	SPU, SPP	KIIs	Methods and types of equipment, number of vehicles	Numbers, types of vehicle and equipment, capacity
		HH	HHS	Have you ever emptied the tank or pit? If yes, how?	Percent of population that has their onsite sanitation technology emptied
	Frequency and volumes of HH emptying	SPU, SPP	KII	Monthly volume of sludge removed by vacuum truck	
		HH	HHS	How often have you emptied your toilet or septic tank?	Number of years
	Average number of visits per day by the vacuum truck (indicative of efficiency)	SPU, SPP	KIIs	How many emptying visits did you do yesterday? The day before?	
	Cost of emptying	HH, SPU, SPP	HHS, KII	Cost of emptying	Money
	Capacity of emptying	SPU, SPP	KII	Do the emptiers fully empty the pits? What is a typical extraction process? How to manage pits	Descriptive

				that have high levels of solids?	
2.3 Transport	Transport practices	SPU, SPP, literature	KII	Method of wastewater transport and percent of the population served by centralized and decentralized sewers with their wastewater reaching treatment facilities	Descriptive and percent
		SPU, SPP, site visit	KII	Methods used for transport of fecal sludge	Descriptive and percent
	Fecal sludge pathways and volumes	HH, SPU, SPP	KII, HHS	Percent of fecal sludge that is collected that is removed from HH immediate environment	
			KII, HHS, emptier, site visit	Percent of fecal sludge that is collected that reaches a treatment facility	
2.4 Treatment	Quantities of fecal sludge arriving at fecal sludge treatment plant	SPU, SPP	KII, site visits	Volumes arriving at fecal sludge treatment sites[37]	
		SPU, SPP, logbook	Site visit	Number of visits per month by the vacuum trucks (disaggregated by private and commercial customers)	
		SPU	KII, site visits	Capacity and design of fecal sludge treatment plant	
		SPU	KII, site visits	Volumes arriving at fecal sludge treatment sites that is effectively treated	
		SPU	KII, site visits	Volumes of transported fecal sludge is disposed of with or without treatment	
2.5 End use and disposal	Re-use	SPU, SPP	KII, site visits	Quantities of fecal sludge that get reused, how it is reused, and who manages the process	

[37] The utility only keeps track of its own volumes. It is unlikely the baseline will capture the adequate data to validate the volumes arriving at the fecal sludge site, returning an initial SFD. Assumptions and data gaps will be made explicit.

Table 18. The enabling environment

Indicator	Sub-Indicator	Data Source	Method	Research Question	Output	Score
3.1 Policy and Strategy	Appropriate policy to context	SPU, municipal services sanitation (MSS), literature	KII, literature analysis	Is there an appropriate sanitation policy that covers the typical sanitation service delivery (FSM, public toilets)? Is it acknowledged and available (national, local, or both)?	1: legal and regulatory mechanisms for FSM exist and are operational .5: legal and regulatory mechanisms for FSM exist but are not operational 0: no legal and regulatory mechanisms for FSM exist	0
	Appropriate regulation and enforcement	SPU, Public administration regulation MSS, literature	KII, literature analysis	Are there regulations in place that enact the policy (at national and local level), such as local bylaws and enforcement? How are the regulations enforced? By whom?	1: Exists and operationalized .5 Exists but not operationalized 0: Doesn't exist	.5
	Pro-poor	SPU, MSS, public administration small and micro enterprise, public administration health, literature	KII, literature analysis	Is there a pro-poor unit, strategy, or policy that specifically addresses the sanitation challenges typically seen in poorer areas?	1: Exists and operationalized .5 Exists but not operationalized 0: Doesn't exist	0
	Interests of ULG	SPU, MSS, public administration small and micro enterprise, public administration health	KII	What are the strategic interests and priorities of DBWSSE and ULG? Overall and general for improving sanitation (or related basic services).	1: Sanitation is a priority for ULG 0: Sanitation is not a priority for ULG	0
3.2. Institutional Arrangements	Roles and responsibilities	SPU, MSS, public administration regulation	KII, literature analysis	According to the administrative framework, who is responsible for providing or delivering sanitation services? Please explain the arrangements.		
		MSS, public administration small and micro enterprise, public administration health, public administration regulation	KII, literature analysis	Who else is involved in delivering sanitation services in Debre Birhan (i.e., public sector, departments, private sector)?		

		MSS	KII, literature analysis	Are these institutional roles and responsibilities for sanitation service delivery clearly defined and operationalized at the town level?	1: Clearly defined and operationalized .5: Clearly defined but not operationalized 0: Not clear	.5
		SPU, MSS, public administration small and micro enterprise, public administration health, public administration regulation	KII, literature analysis	In practice, who leads the coordination between the different agencies? Is it effective? What are the challenges?	1: Clear lead agency and effective coordination .5 lead agency but limited coordination 0: no clear lead agency and poor coordination	0
3.3 Sector Planning & Monitoring	Service targets	MSS, SPU	KII, literature analysis	Are there service targets or a service charter for sanitation? Where are these articulated (i.e., a national development plan or city development plan)? What are they? If at national level, are they being adapted for city level? If so, how?	1: Targets are clearly included .5: Service levels are included, but no targets stated 0: No reference to service levels or targets	0
	Monitoring	MSS, SPU	KII, literature analysis	Who monitors the performance of DBWSSE and how?	0: The ULG is not meaningfully involved in the monitoring of the Service Delivery Unit (SDU) .5: The ULG formally monitors the performance of the SDU, but not in a transparent or participatory manner 1: The ULG effectively monitors the performance of the SDU (e.g., standing committee of council)	1
	Planning	SPU, MSS	KII, literature analysis	Does DBWSSE have any interaction with community groups (such as participatory planning or social accountability or oversight mechanisms)?	0: No (or yes, but ineffective) .5: Yes, but only partially effective 1: Yes, the SDU has	1

					effective participatory planning / social accountability	
3.4. Budgeting and Finance	Financial planning and procurement	MSS, PAF	KII, literature analysis	In practice, does the ULG plan and manage the procurement of capital investments or infrastructure required for the service? The de facto situation is revealed by the extent to which central agencies (directly or indirectly) provide or control the capital infrastructure for the relevant urban service delivery function. If infrastructure investments are made through local accounts, but the ULG does not have meaningful control over planning and prioritization, please assign half of the points indicated.	0: No, a higher-level authority plans and manages the procurement of capital investments and infrastructure required for the service .5: The ULG (or SDU under ULG) has partial control over infrastructure planning and procurement 1: The ULG (or SDU under ULG) has full control over infrastructure planning and procurement	
		MSS, PAF, SPU	KII, literature analysis	In practice, is the ULG responsible for planning and procuring the recurring costs (including operation and maintenance, human resources) required for providing the service?		
		MSS, PAF, SPU	KII, literature analysis	Does the ULG approve and manage the budget of the DBWSSE or service delivery unit?		1
		MSS, PAF, SPU	KII, literature analysis	Are sanitation investments incorporated into an approved and used investment plan, including ensuring adequate human resources and technical assistance? (Ideally a medium-term plan, but if not, at least an annual plan.)	1: Yes .5: Partially 0: No	1
	Spending and cost recovery	SPU	KII, literature analysis	What is the current annual DBWSSE spending for sanitation? (Break down if possible.)		

		PAF (or whoever holds the budget)	KII, literature analysis	What percentage of operation and maintenance costs[38] are recovered through tariffs?	1: Full cost recovery .5: Partial cost recovery 0: No cost recovery	.5
		MSS, PAF	KII, literature analysis	What are the current annual public-sector investments in sanitation?	1: Public investments in sanitation are sufficient .5: Public investments in sanitation are limited 0: No public investments or dedicated budget line in sanitation	0
3.5. Capacity	Capacity and resourcing of ULG	MSS	KII	In the ULG how many people are dedicated to sanitation? What is their role and other demands? What are their capacity challenges?		.5
	Capacity and resourcing of DBWSSE	SPU	KII	How many people in DBWSSE are dedicated to sanitation (number and percent)? What are the roles? What are their biggest challenges? (Prompt regarding capacity, time, resources)		.5

Table 19. Interfaces

Indicator	Sub-Indicator	Data Source	Method	Research Question	Output
What are the key interfaces and/or relationships and gaps in sanitation service delivery?	Organization of stakeholders	Learning alliance, HH	KII	Is there community leadership or organization? What is its objective and how often does it meet?	Descriptive and ranking
		Learning alliance	KII	How many saving groups are there in the kebele?	Number
		SPU, SPP	KII	Is there an association of emptiers? How well is it organized? How many members? Who are the members? What is the aim? How effective?	Descriptive and ranking
	The nature of the relationships between stakeholders	HH, SPU, SPP	HHS, KII	Does DBWSSE have any direct link with households for sanitation? If so what (e.g., contracts, payments)?	Descriptive
		HHS	HHS	How did you (HH) locate your chosen emptier?	
		HHS	HHS	What was the trigger to get pit or tank emptied?	

38 Referring to all sanitation services provided by utility, municipal department for sanitation and beautification, etc.

		Learning alliance, MSS, public administration small and micro enterprise, public administration health	KII	Is there a relationship between community leadership and ULG? Do they meet formally? If yes, how often? Why? When? What is the nature of this relationship? Is it effective?	Descriptive and ranking
		SPU, SPP	KII	Is there a relationship between the emptiers and DBWSSE? Do they meet formally? If yes, how often? Why? When? What is the nature of the relationship (e.g., contract, license, forum for debate, information)?	Descriptive and ranking
		SPU, MSS	KII	Does DBWSSE meet with the ULG? If yes, how often? Why? When? What is the nature of this relationship (e.g., service contract, legal requirement, etc.)? How do they share information, communicate, etc.?	Descriptive and ranking

Annex B: Key Informant Interviews

Table 20. Key informants

Organization	Position
Town: Learning Alliance	All key informant interview learning alliance members
Town: Municipality	Sanitation and beautification process owner
Health Office	Sanitation and hygiene officer
Town Water Supply and Sewerage Enterprise	Manager
Town Water Supply and Sewerage Enterprise	Technical manager of FSM operations
Town Finance Office	Office head
Amanuel Development NGO	Manager
N/Shewa Zone Land Administration and Use	
Dashen Brewery	
Debre Birhan World Bank Project	Project Management Unit
Kebele Administration (3)	Chairperson
Environmental Health Officer (3)	Health extension worker
Communal Latrine Administrator (2)	
Public Latrine Operator (2)	

Annex C: Transect Walk Record Sheet

In Table 21, the final "score" for each of the categories will be the average of the general conditions found in the community.

As you walk around, place ticks against the descriptions that best describe examples of what you see. At the end of the transect walk, decide what the average of all the ticks should be for each of the categories and mark this clearly with a score of 1 to 5.

When a particularly high-risk situation (conditions 4 or 5) is seen, make a note of this in Table 21 (column on the right) for relevant categories (1, 4, Sa, Sb and 8). In each case, ask local people how frequently this situation occurs.

Make a note of the frequency in Table 21 (far right column) and complete details in Table 22 for the most significant locations and risks.

When you have finished the transect walk, ask some community members the questions in Table 23.

Table 21. Transect walk record sheet

City:				Location:
Economic status:	(Tick the appropriate response) Middle-income: _____ Low-income: _____			Date:
GPS coordinates at start are:				
Is the area at risk of flooding?				Weather conditions on the day:
Brief Description				
Category	**Description of observed risks**	**Score**	**Location(s) where high risk is seen**	**How often does this risk occur?** *(Ask the community for information) Annually = 1, Monthly = 2, Weekly = 3, Daily = 4*
Drainage (storm water and gray water). Describe the condition of the drainage structure	Limited drainage infrastructure. Standing storm water and/or gray water is visible on the ground, close to homes or water points	5		
	Limited drainage infrastructure, with signs of storm water and/or gray water having overflowed recently close to homes or water points	4		

	Limited drainage infrastructure, but with no signs of having overflowed close to homes or water points	3		
	Drainage channels in a poor condition directing storm water and/or gray water away from homes and water points	2		
	Drainage channels, well maintained and adequate to take flows.	1		
Note: Gray water is domestic wastewater that does not include toilet waste and does not contain visible fecal material.				
Drainage (blackwater) Describe where you see, or identify, that blackwater is entering into the environment	Limited sewer infrastructure with visible standing blackwater close to homes or water points.	5		
	Broken sewer pipes close to homes or water points, with signs of having overflowed recently.	4		
	Broken sewer pipes close to homes or water points, but with no signs of having overflowed.	3		
	Piped sewers with signs of some leakage or blockages.	2		
	Adequate and well-maintained piped sewers, with no signs of leakage or blockages.	1		
Note: Blackwater is domestic wastewater that includes toilet waste and contains visible fecal materials.				
3. Access to water points	No piped water supply to households or public water points are identified.	5		
	No piped water supply to households, but water is available from public standposts, vendors, private wells, or boreholes.	4		
	Some piped water supply to households, or boreholes. Other water is available from public standposts or vendors.	3		

	Intermittent piped water supply to all or most households. Water from vendors may also be available.	2		
	Continuous piped water supplies to public standposts, on-plot or in-house. Water from vendors may also be available.	1		
4. Evidence of solid waste	Piles of solid waste are accumulating in many sites, close to where people live and work, and at times are obstructing drainage or irrigation channels.	5		
	Piles of solid waste are accumulating in three or more sites, close to where people live and work, but are not obstructing drainage or irrigation channels.	4		
	Piles of solid waste are accumulating in one or two sites, but away from where people live and work.	3		
	Waste bins or enclosures are provided for solid waste collection, but the number of bins is inadequate and overflow is evident.	2		
	An adequate number of waste bins or enclosures are provided, with no overflow evident.	1		
5a. Evidence of human fecal materials – through open defecation	Frequent visible, widespread evidence of human feces is seen.	5		
	Visible evidence of human feces is seen but limited to a few locations.	4		
	Human feces are seen one or two times, but in places away from the population.	3		
	Possible evidence of human feces is seen, mixed with solid waste.	2		

	No visible evidence of human feces through open defecation is seen.	1		
Note: Open defecation is when people defecate directly in the environment, rather than defecating in a latrine with a pit or septic tank.				
5b. Evidence of human fecal materials – through dumped fecal sludge	Frequent visible and widespread evidence of dumped fecal sludge is seen.	5		
	Visible evidence of dumped fecal sludge seen but limited to a few occasions.	4		
	Dumped fecal sludge is seen one or two times, but in places away from the population.	3		
	Possible evidence of fecal sludge is seen, mixed with solid waste.	2		
	No visible evidence of dumped fecal sludge seen.	1		
6. Evidence of animal fecal materials	No visible evidence of animal feces is seen.	5		
	No visible evidence of dumped fecal sludge is seen.	4		
	Visible evidence of animal feces is seen limited to a few locations.	3		
	Animal feces are seen one or two times but in places away from the population	2		
	Possible evidence of animal feces is seen, mixed with solid waste.	1		
7. Household latrine coverage (individual or shared with known families) (you will need to ask people for information to be able to complete the correct response)	Less than 25% of households have access to a household toilet. The majority (more than 75%) appear to be poorly maintained.	5		
	Between 25% to 75% of households have access to a household toilet. Most (more than 50%) appear to be poorly	4		

	maintained.			
	Between 25% to 75% of households have access to a household toilet. Most (more than 50%) appear to be well maintained	3		
	More than 75% of households have access to a household toilet. They are in various conditions of maintenance and cleanliness.	2		
	More than 75% of households have access to a household toilet. Most (more than 75%) appear to be clean and well-maintained	1		
8. Public latrine coverage Note: This category includes "pay-per-use" facilities (including at markets, bus stations, etc.) but does not include institutional facilities at schools, offices, etc.	Where public facilities are present, they are all poorly maintained with evidence of fecal contamination in the local environment.	5		
	Where public facilities are present, most (more than 50%) are poorly maintained with some evidence of fecal contamination in the local environment.	4		
	Where public facilities are present, they are in various conditions of maintenance and cleanliness.	3		
	Where public facilities are present, most (more than 50%) are generally clean and well-maintained.	2		
	Where public facilities are present, they are in frequent use, clean, and well-maintained. OR there are no public facilities present.	1		
Note: You may need to ask people for information to be able to complete the correct response.				
9. Presence of wastewater and/or fecal sludge treatment facilities	Wastewater and/or fecal sludge treatment facilities (e.g., composting of wastes) are present, poorly maintained, and insecure.	5		

	Wastewater and/or fecal sludge treatment facilities are present, poorly-maintained, secure from overflow.	4		
	Wastewater and/or FS treatment facilities are present, and are well-maintained, but with possible direct risk such as from scavenging animals or waste pickers.	3		
	Wastewater and/or fecal sludge treatment facilities are present, and are well-maintained with no evident risks.	2		
	No wastewater and/or fecal sludge treatment facilities present.	1		
Note: In many cities, it is very unlikely that you will see any treatment facilities.				
10. Housing and public space arrangement	Less well or poorly organized development, with highly restricted access for public service vehicles and no clearly defined public spaces.	5		
	Less well-organized development, with mostly temporary housing, limited access for public service vehicles, and very few clearly defined public spaces.	4		
	Well organized development, with semi-permanent and/or temporary properties, limited access for public service vehicles, and only a few clearly defined public spaces.	3		
	Well organized development, with permanent and/or semi-permanent properties, but restricted access for public service vehicles and public spaces, including some open spaces.	2		
	Well organized development, with permanent and/or semi-permanent properties, good access for public service vehicles and public spaces, including open spaces.	1		

11. Paths Routes wide enough for pedestrians and possibly motorbikes	Very narrow paths that can be used by pedestrians only too narrow for motorbikes).	5		
	Poorly maintained dirt paths wide enough for motorbikes.	4		
	Well-maintained dirt paths wide enough for motorbikes.	3		
	Gravel or paved paths, in poor condition, wide enough for motorbikes.	2		
	Gravel or paved paths, in good condition, wide enough for motorbikes.	1		
12. Roads Routes wide enough for vehicles (cars, 3-wheelers, donkey carts, etc.)	Unsurfaced roads, wide enough for small carts or 3-wheeler, but not for car access.	5		
	Unsurfaced roads wide enough for cars to pass	4		
	Gravel or paved roads, wide enough for small carts or 3-wheeler, but not for car access.	3		
	Gravel or paved roads, wide enough to allow two cars to pass.	2		
	Well maintained gravel or paved road, wide enough for two cars to pass.	1		

Where areas of high-risk of contamination are identified (scoring 4 or 5), complete further details as appropriate and to the extent possible.

Table 22. High risks observed (for categories 1, 4, Sa, Sb, and 8)

Category *Type of contamination seen.*	**Source of Risk** *Briefly state the problem that you have seen. Complete for each category.*	**Human interaction** *State how humans are interacting (coming into contact) with the contamination (e.g., washing, playing, walking, scavenging).*	**Route of Contamination** *State the main routes of contamination (e.g., hands, feet, flies, food, fields/crops, soil).*	**Who is Exposed?** *Comment on who is exposed to the contamination (e.g., all people, adults only, children only, or identified vulnerable groups).*	**GPS Coordinate**	**Photo-graphs** *Details of any photos taken.*
1. Drainage (stormwater and/or gray water)						
4. Solid waste pile						
5a. Open defecation						
5b. Dumped fecal sludge						
8. Public latrines						

The following questions are asked to a group of community members. Try to limit this to a maximum of eight people in the group. All people in the group should live in the community and be aware of the conditions throughout the year. Consent must be sought by all participants before asking this short set of questions.

Table 23. Practices in the community

Topic Area	Question	Response
Awareness of risk-free FSM practices: levels and causes of risk	Read out or show the following list of activities that might happen in this community. • Open defecation • People throwing feces out with solid waste • Overflowing latrines • Latrines emptying into drains • Uncontrolled latrine emptying by households • Spills of fecal sludge during emptying or transport • Uncontrolled dumping of fecal sludge	
	1. Of these activities, which three occur most frequently in your community if any?	Rank the top 3 ☐ Open defecation ☐ People throwing feces out with solid waste ☐ Overflowing latrines ☐ Latrines emptying into drains ☐ Uncontrolled latrine emptying by households ☐ Spills of fecal sludge during emptying or transport ☐ Uncontrolled dumping of fecal sludge ☐ Other (specify)
	2. Where is the contamination occurring?	Tick all that apply

		Specific locations (specify) ☐ Household latrines ☐ Public latrines ☐ Communal latrines ☐ Drain ☐ Public water points (hand pumps, standpipes, etc.) ☐ River stream ☐ Ponds ☐ Solid waste dump site ☐ Generally scattered throughout the area ☐ Other (specify) ☐ DK (Don't Know)
	3. How often does the most significant of this happen?	Tick one
		☐ Every day (i.e., all the time) ☐ Most weeks (i.e., most of the time) ☐ During certain months (i.e., some of the time) ☐ Seasonally ☐ During the rainy season(s) ☐ During the dry season ☐ Other seasons (specify) ☐ Other (specify) ☐ DK

	3. Has there been a diarrheal outbreak affecting large number of people in the past one year?	☐ Yes ☐ No → End ☐ DK → End
	5. In which month did this start?	Circle
		Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Name and signature of the participants		
Name	Signature	Date

To learn more about the Sustainable WASH Systems Learning Partnership, visit:
http://www.globalwaters.org/SWS

Tetra Tech, Inc.
159 Bank Street, Suite 300
Burlington, Vermont 05401 USA
Telephone: (802) 658-3890
Fax: (802) 495-0282

Tetra Tech Contacts:

Lucia Henry, Associate
lucia.henry@tetratech.com

Jonathan Annis, Associate
jonathan.annis@tetratech.com

University of Colorado Boulder

Environmental Incentives

IRC Supporting water sanitation and hygiene services for life

LINC

TETRA TECH

UNIVERSITY OF OXFORD

WaterSHED Water, Sanitation & Hygiene Enterprise Development

Whave a fair future